Myopic loss aversion when deciding for others and convex bonuses

Abstract

Myopic loss aversion (MLA) is provided as explanation of the equity premium puzzle. This research adds a realistic component to the analysis of MLA as such, namely MLA when investing for another without and with convex bonus system for the decision maker. The link between convex bonus systems and MLA is new. This is investigated with use of an online experiment. The findings are as follows. Decision makers display MLA-like investment acting without and with convex bonuses. A convex bonus system appears to have no effect on MLA. However, the findings are not robust to several checks. This is in line with existing literature. Existing literature also displays inconsistency of results.

Keywords:

Equity premium puzzle

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Experiment

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1: Introduction

The equity premium puzzle is a term coined by Mehra and Prescott (1985). They observed abnormal outperformance of bonds by stocks in the United States over the past century. This difference in returns cannot be explained by reasonable levels of risk aversion. The abnormal equity premiums have also been observed for other countries (Dimson, Marsh, & Staunton, 2011; Kyriacou, Madsen, & Mase, 2004). Many potential solutions to the equity premium puzzle have been provided throughout the years. Some disregard the presence of an equity premium puzzle, i.e. the equity premium puzzle is observed because of data biases (Blanchard, Shiller, & Siegel, 1993; Fama & French, 2002; Jorion & Goetzmann, 1999; Rietz, 1988). Others accept the presence of the equity premium puzzle and aim to give explanations for it via model assumptions (Bansal & Yaron, 2004; Constantinides, 1990; Epstein & Zin, 1991; Mankiw & Zeldes, 1991). One of these explanations for the equity premium puzzle via model assumptions is 'myopic loss aversion' (hereafter abbreviated as MLA). This explanation is provided by Benartzi and Thaler (1995). It is a conjunction of two concepts in the psychology of decision making: loss aversion and mental accounting. Loss aversion refers to the tendency of individuals to be more sensitive to losses than to gains. This is reflected in the value function of prospect theory (Tversky & Kahneman, 1979). Mental accounting refers to the methods individuals use to code, categorize and evaluate economic outcomes (Thaler, 1985). In this case, the tendency of investors to asses investments with a short evaluation period, i.e. evaluate investments myopically, is relevant. This is also called narrow framing (Kahneman & Lovallo, 1993). MLA-driven investors require a risk premium for holding stocks, as stocks display a higher loss probability and amount than bonds on the short term. This could explain the equity premium puzzle, which could not be explained by reasonable risk aversion levels.

Experimental support for MLA when investing for oneself and its effect on investment propensity is numerous (Bellemare et al., 2004; Benartzi & Thaler, 1999; Fellner & Sutter, 2009; Gneezy & Potters, 1997; Langer & Weber, 2008; Thaler et al., 1997). Generally, the effect of MLA on investment propensity is negative. In more specific cases, myopia could increase investment propensity, i.e. with low chance on high losses (Langer & Weber, 2005). The literature divides two ways to alter the evaluation period of investors: via the length of decision binding and via the frequency of information feedback. There is no consensus on the question which of the two the main driver of MLA is and whether there is an interaction effect between the two (Bellemare et al., 2004; Fellner & Sutter, 2009; Langer & Weber, 2008). This diversity in results can be observed in Table 5 in Appendix A.

The effect of MLA on investment levels has been observed in other contexts as well. This underlines its importance. MLA is observed in experimental markets (Gneezy, Kapteyn, & Potters, 2003; Mayhew & Vitalis, 2014) and real markets (Kliger & Levit, 2009).[1] Professional traders and financial advisors also display MLA (Eriksen & Kvaløy, 2010a; Haigh & List, 2005). Groups are also succumb to MLA, however, to a somewhat lesser degree (Sutter, 2007). Remarkably, adolescents do not seem to be prone to MLA (Glätzle-Rützler et al., 2015).[2]

The question is: do investors also exhibit MLA when deciding for others? An investor deciding for another does not incur the losses itself. So there is no obvious reason to display MLA-driven investment behavior for the decision maker. Lots of investment is conducted by fund managers on behalf of others. In fact: more than 50% of the stocks listed on the New York Stock Exchange is held by institutional investors investing for others. Think of pension funds, life insurance companies and mutual funds. An answer to this question, therefore, validates or falsifies MLA as explanation of the equity premium puzzle. This answer has been provided by Eriksen and Kvaløy (2010b). Investors deciding for others exhibit MLA over the others' money, just as they do over their own money (but in a somewhat lesser degree), due to other-regarding preferences over the others' outcome. This validates MLA as explanation of the equity premium puzzle.

In contrast, this research hypothesizes these other-regarding preferences to be crowded out by self-regarding preferences under a convex bonus system. In our experiment: fund managers acting under a convex bonus system would maximize own monetary income, via investing the maximum amount possible. Not adhering to this proposition does not only show other-regarding behavior, but also shows self-hurting behavior. Convex bonus systems in the financial world are under scrutiny, as they are accused of being the cause of the recent financial crisis (Rajan, 2006). Ironically, here, they might benefit risk-averse clients by potentially resolving MLA. Benartzi and Thaler (1995) argue persuasively that agency problems may cause fund managers to display MLA: short term incentives generate short

[1] Individual irrationality does not imply markets are irrational. Knez, Smith and Williams (1985) provide the classical argument for this. The proof of MLA in markets was essential to validate MLA as explanation to the equity premium puzzle.

[2] This result could be due to self-selection bias.

horizons and therewith MLA. In contrast: this research hypothesizes these short term incentives to be the very solution to MLA.

The build-up of this experiment is as follows. First, the robustness of MLA when deciding for others will be tested with use of a US sample. This has yet only been tested by Eriksen and Kvaløy (2010b) with a Norwegian sample. The second – and main – purpose of this article is then to examine MLA when deciding for others acting under a convex bonus system. Specifically: the fund manager shares for about 14% in gains on investment, but does not lose in case of a loss. A link between convex bonus systems and MLA has not been investigated yet. Since the discovery of the equity premium puzzle, there has been a zealous pursuit to find explanations for it. Promising explanations are further put to the test. This research fits into that strand of literature. It adds another realistic component to the analysis of MLA.

The experiment makes use of a 2-by-2 between-subjects design. The evaluation periods and bonus systems of fund managers are manipulated between treatments. Fund managers perform a derivative of the Gneezy and Potters (1997) investment task (hereafter abbreviated as GP-task) for their client. The experiment is built with Qualtrics and distributed with Prolific. The total number of participants is 280: 140 fund managers and 140 clients.

The findings of the experiment are as follows. With respect to the first purpose: an MLA effect is found for fund managers investing for clients absent convex bonus system. With respect to the second purpose: an MLA effect is found for fund managers investing for clients present bonus system. However, these findings are not robust to plausible data filters and other data analysis techniques. This fits into existing MLA literature. Findings about MLA are inconsistent. Minor design differences make big differences in results.[3] This non-robustness might raise questions about the explanatory power of this research. However, alternatively, one could also question the explanatory power of MLA as explanation of the equity premium puzzle. The latter is most certainly a more serious concern.

The rest of this paper is build up as follows. Section 2 elaborates on experimental design and hypotheses. Section 3 discusses important results, limitations and provides recommendations for future research. Section 4 concludes.

[3] Zeisberger, Langer and Weber (2012) investigate myopic loss probability aversion as alternative for MLA. The results of their experimental pre-test favored MLPA over MLA. But the results of their actual experiment favored of MLA over MLPA.

2: Experimental design

In this experiment, subjects performed a derivative of the GP-task. The GP-task is common to elicit risk taking of subjects between different treatments. The difference between the original GP-task and this task: here subjects (hereafter fund managers) invest for others (hereafter clients) and can in same cases earn bonuses itself.

2.1: Experimental design

The experiment is constructed with a 2-by-2 design. The evaluation period of fund managers is manipulated between treatments to test for a MLA effect. The bonus system of fund managers is manipulated between treatments to test if a convex bonus system nullifies a potential MLA effect.

With respect to the manipulation of the evaluation period of fund managers: investment levels in a 'frequent' treatment will be compared to an 'infrequent' treatment. Fund managers in the frequent treatment: receive performance feedback after each round and can change their decision after each round. Fund managers in the infrequent treatment: receive performance feedback after 3 rounds and can change their decision after 3 rounds. More frequent performance feedback creates conditions for backward-looking MLA (Fellner & Sutter, 2009). Shorter decision binding creates conditions for forward-looking MLA. MLA is observed when the investment level in a frequent treatment is lower than in an infrequent treatment. This is explained more thoroughly in Section 2.3.

With respect to the manipulation of the bonus conditions of fund managers: differences in investment levels (between a frequent and infrequent treatment) in an absent bonus system treatment will be compared to a present bonus system treatment. Fund managers in the absent bonus system treatment: invest for others with monetary consequences for the other, but not for themselves. Fund managers in the present bonus system treatment: invest for others with monetary consequences for the others and themselves. These fund managers get a bonus when the investment was successful, but lose nothing when the investment was unsuccessful. Nullification of MLA is observed when the investment level in a frequent–present bonus system treatment is equal to the investment level in the infrequent–present bonus system treatment (on the condition that MLA is observed absent bonus system). This is explained more thoroughly in Section 2.3.

The investment task consists of 9 rounds. Each fund manager is provided with 100 experimental currency (100 EC=0.10$) each round to invest for a client. Each fund manager can decide on the amount X to invest in a risky asset per round. The risky asset has a 2/3 probability to lose the invested amount X. The risky asset has 1/3 probability to return 2.5 times the invested amount X plus the invested amount X. In the present bonus system treatments: the fund managers earn 0.4 times the invested amount X in case of successful investment, but lose nothing in case of unsuccessful investment. The pay-off functions per round are displayed graphically below in Table 1.

Table 1

Pay-off functions of client and fund manager subjects per treatment

	Subject type	Lottery win	Lottery loss
F	Client	100+2.5X	100-X
	Fund manager	-	-
I	Client	100+2.5X	100-X
	Fund manager	-	-
F+	Client	100+2.5X	100-X
	Fund manager	0.4X	0
I+	Client	100+2.5X	100-X
	Fund manager	0.4X	0

Notes. Pay-off functions per round and invested amount $X \in \{0,100\}$. Pay-off per round of fund manager in the treatments absent bonus system (F and I) is not applicable, since there is no bonus system.

Descriptive statistics and control variables used in this research are explained in more detail in Appendix B.

2.2: Design and distribution motivation

This subsection motivates important design and distribution choices.

Framing of losses. This experimental design corresponds to part 1 of Gneezy and Potters' (1997). Their part 2 is excluded in this experiment. In their experiment: after part 1 earnings of each subject were totaled and functioned as endowment to invest in part 2. Their reason for part 2 was to create a perception of real losses when subjects lost bets. Subjects might not perceive lost bets as real losses in part 1, because they are provided the money by an experimenter. However, subjects risk their previous earnings in part 2. The reasons why part 2 is excluded in this experiment is as follows. Firstly, Gneezy and Potters (1997) observe similar results in part 1 and 2. This reduces the urgent need to perform this check. Secondly, it is only natural to be provided with an external endowment (of a client) when investing for another. This is obviously not the case in their research when investing for oneself.

Another point is gain/loss domain framing. The experiment description displays pay-off functions and lottery profit function. The outcome screen displays outcomes. These are provided in Appendix B. The pay-off functions are displayed in the gain domain. In case of clients: the endowment is integrated in the pay-off function. Profit of lottery is displayed in the mixed domain. These domain frames are realistic, but others would have been too. Since domain frames can operate as confounding factor (Füllbrunn & Luhan, 2020), we regard it important to clarify our frames.

Anonymity. The fund managers' identity and choices were not known by client, only the total earnings were known by client. The clients' identity was also not known by the fund manager. This was clear for the fund manager. The reason for this was to exclude potential accountability effects. A risk of this: this level of anonymity could lead to a scenario in which fund managers perceive this experiment as an investment game. This is especially at risk in the absent bonus system treatments. Eriksen and Kvaloy (2010b) tested and falsified this concern. However, the contact between fund manager and client is even scarcer in this research. We assume subjects to understand this experiment rightly, but we assume this with caution.

Online experiment. The Covid-19 crisis made an online experiment the only viable choice. It is not clear if this choice would have been made without his crisis. Arguments in favor and against are as follows. In favor: an online sample of the general population provides more accurate estimates of revealed risk preferences of the general population than the commonly used lab student sample (Von Gaudecker, Soest and Wengström, 2012). However, this research sample is not supposed to replicate the general population, but fund managers. Against: MLA behaviors of student samples and financial traders and advisors are quite similar. Financial traders and advisors were even more prone to MLA than students (Eriksen & Kvaloy , 2010a; Haigh & List, 2005). It has not yet been tested if an online sample of the general population, like our sample, is better in replicating fund managers' behavior with respect to MLA

Experimental currency. The reason for experimental currency is as follows. In that case, subjects have more investment levels to choose from: from 0 to 100 in steps of 1. In the alternative case of real money, subjects could only choose from $0.00 to $0.10 in steps of 1 cent. Letting subjects decide on 0.1 cent would have been odd. The use of experimental currency could create a confounding factor: medium effects. However, with our clear-cut use of experimental currency, we should avoid the different types of medium effects Hsee et al. (2003) warn for. To corroborate this claim: using percentages versus absolute amounts does not shake up results according to Langer and Weber (2008). Our 0 to 100 EC case is similar to percentages.

Lottery outcomes. This point is about the display of lottery outcomes in the infrequent treatments. The purpose of the infrequent treatments is to alter the evaluation period of decision maker subjects. Therefore, lottery outcomes are shown simultaneous and aggregated. Hence, subjects are not able to assign a gain or loss to a specific round and experience it myopically. This corresponds to the design of Gneezy and Potters (1997). This deviates from the design of Eriksen and Kvaloy (2010b), which provide subjects with both separate and aggregated lottery outcomes.

Bonus fund manager subjects. Two important decisions have been made on this regard. The first important decision is: the client pay-off function is held equal in all treatments. This holds other-regarding preferences over the others' outcome between treatments equal. We pay the convex bonus on top of that in the present bonus system treatments. Consequentially, lottery winnings are higher in the present bonus system treatments than absent bonus system treatments. Hence, there is more money in the economy. There are two options to hold money in economy equal. One: hold the lottery outcomes the same between treatments, but pay part of lottery winnings to the fund manager. This leads to a different client pay-off function. This fits better in another strand of literature: is it beneficial to invest in managed funds (Cuthbertson, Nitzsche, & O'Sullivan, 2008). This is not the focus of this research. Two: compensate fund manager subjects in the absent bonus system treatments with a higher fixed fee. This has two disadvantages. First, it is cumbersome to determine the right fixed fee.[4] Second, this connects less to previous MLA research. Our current design fits with the no bonus condition design of Eriksen and Kvaloy (2010b).

The second important decision is: the pay-off function of the fund manager is displayed segregated from pay-off function of client. This has two consequences. One: pay-off functions of clients are framed equally across treatments. Two: the bonus is framed less as hurtful to the client. The bonus is namely not directly linked to the clients' pay off in this framing. This design choice is made to generate the first consequence.

[4] A procedure would be as follows. Determine difference in money in economies between our absent bonus system treatments and present bonus system treatments. Compensate this difference in a new absent bonus system treatment with a higher fixed payment of fund managers.

2.3: Predictions

The experimental design allows for two relevant examinations. An examination of MLA when investing for another absent bonus system and an investigation of MLA for another present bonus system. The first is examined with use of the absent bonus system treatments *F* and *I*. The second is examined with use of the present bonus system treatments *F+* and *I+*.

2.3.1: Hypothesis absent bonus system

A combination of subjective expected utility theory (hereafter SEU) and other-regarding preferences over the others' outcome predicts no systematic difference in investment levels of treatment *F* and *I*. This proposition holds if agents behave according to a utility function with constant relative risk aversion or if agents are risk neutral (Harrison & Rutström, 2008). In addition: we assume negligible wealth effects on risk aversion. [5] [6]

A combination of MLA and other-regarding preferences over the others' outcome predicts a systematic difference in investment levels. We assume decision makers behave according to a prospect theoretical value function with other-regarding preferences over the clients' investment outcome, which is displayed below (Tversky & Kahneman, 1992).

$$U(x) = \eta x^{a} \qquad if\ x \geq 0$$

$$U(x) = -\lambda(-x)^{b} \quad if\ x < 0$$

The parameters are specified as follows: x stands for the change in wealth of client since last time measured, λ/η stands for the level of loss aversion, a and b stand for the level of risk aversion. Tversky & Kahneman (1992) estimated the parameters values of a typical (median) investor: λ/η is 2.25, and a and b is 0.88.

Assuming our decision makers display similar parameter values as the above, then investment levels in treatment I will be significantly higher than in treatment F. This prediction still holds if $\lambda/\eta > 1$, and $a = b < 1$ (see Langer and Weber (2005) for a more detailed explanation on

[5] The frequent treatment inherently receives information on wealth position every round, whereas the infrequent treatment only receives this info after 3 rounds. This extra information affects risk preference. See section 2.2 of Gollier, Lindsey and Zeckhauser (1997) for a situation similar to ours. However, in our experiment stake sizes and therewith wealth effects are relatively small. This assumption is therefore justified.

[6] Another framework would lead to a similar prediction. Assume: a decision maker displaying solely self-interest in own monetary income. If this decision maker decides for another without own monetary incentives, then the decisions are like a roll of a dice. This also predicts no systematic differences in investment levels of treatment *F* and *I*. However, via the framework in use we stay away from the discussion about homo economicus. One could namely argue that economic man's utility is linked to others' perceived utility.

this). This functions as our first hypothesis, in which the null hypothesis expects no systematic differences in investment levels between these treatments as described above.

Hypothesis 1: Decision makers invest more in treatment I than F

2.3.2: Hypotheses present bonus system

Two comparable predictions can be derived based on different assumptions. First: a combination of SEU-theory and other-regarding preferences over the others' outcome predicts no systematic differences in investment levels $F+$ and $I+$. Also we assume the coherent conditions for this prediction to hold, which are described in previous subsection.

Second: self-regarding preferences predicts maximum investment in both treatments, i.e. no systematic difference in investment levels of treatment $F+$ and $I+$. This prediction holds in case of SEU behavior or prospect theoretical MLA behavior. In both cases: a decision maker maximizes its utility via this way, without downside risk.

We prefer the second reasoning over the first. The reason for this is as follows. Füllbrunn and Luhan (2020) linked the concept of loss aversion and limited liability bonus systems. In their research, investment for others is significantly lower than for oneself. This is called a cautious shift in investment and supports the other-regarding preferences over the others' outcome hypothesis. When a limited liability bonus system for their decision makers is introduced, there is significantly more investment on behalf of others when compared to investing for another absent bonus system. This holds even in the case of a bonus system which leads to a negative expected value of investment for the client. This indicates self-regarding preferences overriding other-regarding preferences, in case both function as opposing forces. Their decision makers show a risky shift in investment on behalf of others under these limited liability bonus systems. However, these decision makers still do not invest the maximum amount. Despite this, we still adhere to this reasoning for our prediction.

The first reasoning is adhered to by Eriksen and Kvaløy (2010b). This is rejected in their research. Our research adds a convex bonus system to the equation. Given its impact according to Füllbrunn and Luhan (2020): we choose the second reasoning. Here both SEU-theory and prospect theoretical MLA can be assumed as a decision makers' behavior. This makes the prediction strong.

The alternative prediction of this part follows the same logical reasoning as the hypothesis of part 1, but then for treatments F+ and I+, leading to alternative hypothesis 2A:

Hypothesis 2A: Decision makers invest more in treatment I+ than F+

Hypothesis 2B combines previous parts and is as follows. If decision makers display higher investment in treatment *I* than *F*, then self-regarding preferences predict this difference to be nullified between treatment *I+* and *F+*. In other words: adding a convex bonus system, nullifies MLA-driven differences in investment levels. It does not matter if decision makers exhibit MLA behavior or SEU behavior for this prediction to hold. In fact: if decision makers display MLA behavior absent bonus system, we suspect the decision makers to exhibit the same MLA behavior present bonus system.

Hypothesis 2B: The decision makers potential higher investment in treatment I than F gets nullified between treatment I+ and F+

3: Results

3.1: Absent bonus system

Do fund managers invest more in treatment *I* than *F*? In other words: do fund managers exhibit a combination of MLA and other-regarding preferences over the others' outcome? These questions will be answered in this subsection. Table 2 shows average investment levels, corresponding standard deviations and one sided Mann Whitney U-tests to investigate the significance of treatment differences absent bonus system.[7]

Table 2

Investment Absent Bonus System – Mann Whitney U tests

Variable: Investment	Treatment *F*		Treatment *I*		MWU-test	
	Mean	SD	Mean	SD	z-value	p-value
Round 1-3	34.851	29.660	32.343	22.179	1.132	0.128
Round 4-6	36.0123	32.036	40.218	27.516	1.027	0.015
Round 7-9	40.851	36.021	45.812	33.663	0.456	0.324
Round 1-9	37.238	32.646	39.458	28.621	1.542	0.061

Notes. Average investment and standard deviations per 3 rounds and per 9 rounds. The right 2 columns report the z-value and p-value of one sided Mann Whitney U-tests examining treatment differences. N=27 (N=32) for treatment *F* (*I*).

The data shows the following pictures. Fund managers invest more in treatment *I* than *F* over 9 rounds (one sided Mann Whitney U-test: N=59, $p<0.1$).[8] The average investment over 9

[7] We excluded subjects whose decision times were among the 5% fastest, 5% slowest, and those who did not understand the survey (scored 1 on a 5 points scale of understanding). If not explicitly stated this data filter is applied throughout the paper.

[8] If not explicitly stated a one sided Mann-Whitney U test is used throughout the paper. A parametric t-test cannot be used, because it assumes observations to come from a normal distribution. This does not fit with our

rounds is 39.458 in treatment *I* and 37.238 in treatment *F*. The systematic difference in investment between treatment *I* and *F* is not observed throughout the whole investment task. No systematic difference in investment is observed in the first three rounds and the last three rounds (N=59, p>0.1). However, in the middle three rounds, fund manager invest more in treatment I than F (N=59, p<0.05).

This leads to observation 1, which holds over 9 rounds, but not per every three rounds.

Observation 1: Fund managers investing for a client absent bonus system invest more if they evaluate the investment infrequently

This observation is in line with the prediction of hypothesis 1. However, is it also in line with the assumptions of hypothesis 1? More specifically: the assumption of other-regarding preferences over the others' outcome. After the investment task, we asked fund managers about their beliefs of their clients' investment wishes. Average beliefs of their clients' investment wishes are higher in treatment *I* (M=37.812, SD=27.697, N=32) than treatment *F* (M=31.814, SD=25.486, N=27). However, this difference in beliefs is not significant (two sided Mann Whitney U-test: N=59, p>0.1).[9] This result is driven by small sample size. Our proposed sample is more than adequate in finding a difference in beliefs between treatments.[10] Additionally, we ran regression models to investigate the effect of fund managers' beliefs of clients' investment wishes on investment in more depth. This shows a significant relationship between beliefs and investment absent bonus system (N=59, p<0.01) and present bonus system (N=65, p<0.01). This is discussed in more detail in Appendix C. However, this finding does not falsify the assumption of other-regarding preferences over the others' outcome yet. This rather indicates there might be another explanation for the systematic difference in investment between treatment *I* and *F*. This alternative explanation is other-regarding preferences over the others wishes. A fund manager invests according to its belief of its clients wishes. MLA of the fund manager does not play a role in the investment decision in that case. This result raises question about the assumptions of our prediction. Furthermore, it raises question about the main inference of Eriksen and Kvaløy (2010b): investment managers

data, which has a lower limit of 0 and an upper limit of 100. In addition, we performed a skewness and kurtosis test. The observations do not come from a normal distribution according to this test. We perform such a test before every Mann-Whitney U test. If not explicitly stated, non-normality is confirmed via this test.

[9] The direction of effect of beliefs of fund managers about clients' wishes is unclear. A two sided Mann Whitney U-test is more appropriate here.

[10] The effect size (ES=0.225) is considered small using Cohen's (1992) criteria. A statistical power analysis of two independent means (*a*=0.05, *p*=0.8) reports a needed sample size of N=622, which corresponds to N=311 per treatment. Power analysis for a Mann Whitney U-test is complex. This power analysis suffices if we assume a general shift in distribution between treatments.

are prone to myopic investment management. Arguments against this result are as follows. Firstly, the finding is not robust: significance depends in some cases on a power analysis. Secondly, other-regarding preferences over the others' outcome versus over the others' wishes undoubtedly lead to similar investment in this setting. Therefore, it is impossible to validate one assumption and falsify the other. An argument in favor of this result: given its serious implications, it is worth discussing.[11]

How does observation 1 compare to other MLA literature? Average investment levels are lower in this research than in other MLA research. Eriksen and Kvaløy (2010b) report average investment levels of 46.66 in treatment *F* and 51.65 in treatment *I* when investing for another over 9 rounds. Appendix A displays average investment levels when investing for oneself of several researches. Average investment is also generally higher there. However, risk taking over others money is lower than over own money according to Eriksen and Kvaløy (2010b). Nevertheless, the reason for this level of difference is unclear. Stake size is higher in other researches mentioned above. Furthermore, there is no unidirectional difference in framing of outcomes between our research and the other researches. Some frame outcomes in the mixed domain, others only in the gain domain and some are not clear on this subject.

A specification of our observation 1 was: the observation holds over 9 rounds, but not per every 3 rounds. The same picture is shown by Eriksen and Kvaløy's (2010b) experiment when investing for another. Their baseline experiment, when investing for oneself, shows another result: observation 1 holds for 9 rounds and also per every 3 rounds. With respect to investing for oneself: significant differences in investment over 9 rounds and per 3 rounds are also observed by Gneezy and Potters (1997) and Bellemare et al. (2004).[12] The findings of this research continue the trend started by Eriksen and Kvaløy (2010b): MLA-like differences in investment levels are observed less frequently when investing for others.

The first purpose of this experiment was to test the robustness of MLA when investing for another with an US sample. This was tested by Eriksen and Kvaløy (2010b) with a Norwegian sample. Why would there be a difference in MLA between countries? The reasoning for this is as follows. Emotion plays a key role in loss aversion and culture affects emotions (see

[11] This has also been investigated present bonus system. Treatment *I+* (M=43.031, SD= 29.819, N=32) is not significantly different from treatment *F+* (M= 38.424, SD= 28.437, N=33). These observations are normally distributed according to a skewness and kurtosis test. Treatment differences are also insignificant according to an independent t-test (N=35, p>0.1).A statistical power analysis of two independent means (a=0.05, p=0.8) reports a needed sample size of N=1259, which corresponds to N=629 per treatment.

[12] Langer and Weber (2008) and Fellner and Sutter (2009) do not explicitly discuss the significance of treatment differences per 3 rounds.

Wang, Rieger and Hens (2017) for a more detailed explanation on this).Their cross-country comparison shows that loss aversion differs between cultural clusters of countries. There is no such cross-country comparison on differences in myopia, as we know myopia in financial literature. However, there is the cross-country comparison of Hofstede on his 5th cultural dimension: long-term orientation (Hofstede, 2001) . Myopia can be regarded as the inverse of long-term orientation. Long term orientation differs between countries.[13] Because of these reasons, it is important to examine MLA across different countries. The equity premium puzzle has been confirmed across globe, although, with differential equity premiums (Dimson, Marsh, & Staunton, 2011; Kyriacou, Madsen, & Mase, 2004). Examining MLA across globe brings pivotal information to validate is as explanation of the equity premium puzzle. The bottom line of this part of the experiment is that, absent bonus system, also US fund managers invest more - for clients - with a long evaluation period than with a short evaluation period.

3.2: Present bonus system

This subsection follows the same build-up as previous subsection. Do fund managers invest more in treatment $I+$ than $F+$? In other words: do fund managers exhibit a combination of MLA and other-regarding preferences over the others' outcome? Or, alternatively, will other-regarding preferences be overridden by self-regarding preferences? These questions will be answered in this subsection. Table 3 shows average investment levels, corresponding standard deviations and Mann Whitney U-tests to investigate the significance of treatment differences present bonus system.

[13] The degree of myopia is exogenously set in this experiment and the experiments of others (Bellemare et al., 2004; Eriksen & Kvaløy, 2010b; Gneezy & Potters, 1997; Langer & Weber, 2008). Fellner and Sutter (2009) show that a myopic evaluation period is chosen endogenously by German students also. This is interesting, because in general Germany scores high on long term orientation (Hofstede, 2001). However, long term orientation depends on personal characteristics, such as being a student, as well.

Table 3

Investment Present Bonus System – Mann Whitney U-Tests

Variable: Investment	Treatment *F+*		Treatment *I+*		MWU-test	
	Mean	SD	Mean	SD	z-value	p-value
Round 1-3	39.828	30.926	44.625	33.417	0.271	0.393
Round 4-6	42.303	33.775	44.937	28.419	1.623	0.052
Round 7-9	49.424	36.412	50.531	33.659	1.136	0.127
Round 1-9	43.851	33.910	46.697	31.928	1.851	0.032

Notes. Average investment and standard deviations per 3 rounds and per 9 rounds. The right 2 columns report the z-value and p-value of one sided Mann Whitney U-tests examining treatment differences. N=33 (N=32) for treatment *F+* (*I+*).

The data shows the following pictures. Fund managers invest more in treatment *I+* than *F+* over 9 rounds (N=65, $p<0.05$). The average investment over 9 rounds is 46.697 in treatment *I+* and 43.851 in treatment *F+*. Similar to the absent bonus system treatments: the systematic difference in investment between *I+* and *F+* is not observed throughout the whole investment task, i.e. in all blocks of three rounds (N=65, $p>0.1$).

This leads to observation 2a, which holds over 9 rounds, but not per every 3 rounds.

Observation 2a: Fund managers investing for a client present bonus system invest more if they evaluate the investment infrequently

This observation is in line with the prediction of hypothesis 2A. Other-regarding preferences are not overridden by self-regarding preferences. In the case of self-regarding preferences, we hypothesized maximum investment in both treatments and consequently no systematic difference in investment levels between treatment *F+* and *I+*. This extremity is not observed. However, there could be an interplay between other-regarding preferences and self-regarding preferences at hand. In other words, the bonus system and with that self-regarding preferences could still diminish the systematic differences between the infrequent treatment and the frequent treatment. Table 4 shows estimated results of a regression models with a Difference-in-Differences design.

Table 4

Investment – Difference-in-Differences

Dependent Variable: Investment	OLS		TOBIT	
	(I)	(II)	(I)	(II)
Infrequent	2.219	3.520	1.260	2.759
	(6.693)	(6.298)	(7.610)	(7.057)
Bonus System	6.613	7.799	6.811	8.338
	(6.859)	(6.438)	(7.928)	(7.799)
Infrequent x Bonus System	0.626	-0.833	1.909	0.024
	(9.480)	(9.429)	(10.813)	(10.743)
General Risk Preference		0.904		0.999
		(1.548)		(1.779)
Social Responsibility Score		3.504		3.281
		(5.191)		(5.772)
Financial Literacy		0.990		1.263
		(2.558)		(2.925)
Female		-3.785		-4.684
		(4.792)		(5.458)
Age		-0.192		-0.205
		(0.205)		(0.230)
Education		-5.460*		-6.158*
		(2.825)		(3.188)
Econ		-12.715*		-15.076*
		(7.455)		(8.693)
Constant	37.238***	75.475**	39.463***	86.254**
	(4.951)	(29.365)	(5.867)	(34.332)
N	1116	1116	1116	1116
(Pseudo) R^2	0.012	0.073	(*0.001*)	(*0.008*)
F Statistic	0.79	2.22**	0.52	2.2**

Notes. Difference-in-Differences OLS-regression and Tobit-regression without and with control variables, respectively columns (I) and (II). Variable *Infrequent* is a dummy of the infrequent treatments (*I* and *I*+). Variable *Bonus System* is a dummy of the present bonus system treatments (*F*+ and *I*+) Variable *Infrequent x Bonus System* is an interaction dummy variable of the infrequent present bonus system treatment (*I*+). Standard errors are clustered at the individual level. Standard errors are in parentheses. N=1116 corresponds to 1116/9=124 subjects. Each individual invests for 9 rounds, i.e. provides 9 observations. (*=p<0.1, **=p<0.05, ***=p<0.01).

The data shows the following picture. The effect of a convex bonus system on the systematic difference of investment between the infrequent and the frequent treatment is not significantly different from zero (N=1116, p>0.1). There appears to be no significant effect from a convex bonus system on treatment differences of investment.

Observation 2b: A convex bonus has no significant effect on treatment differences in investment between the infrequent treatment and frequent treatment

This observation is not in line with prediction of hypothesis 2b. How do observations 2a and 2b compare to other convex bonus literature? The link between convex bonus systems and MLA is introduced in this research. No other research is available on this specific link.

However, the basis for this part of the experiment is the finding of Füllbrunn and Luhan (2020). Self-regarding preferences crowd out other-regarding preferences with a limited liability bonus system in their loss aversion on behalf of others research. Here this is not the case. Noticeably is that average investment levels in our present bonus system treatments, respectively 46.697 in treatment *I+* and 43.851 in treatment *F+*, are higher than in our absent bonus system treatments, respectively 39.458 in treatment *I* and 37.238 in treatment *F*.[14] However, this is a logical consequence of the higher expected value of the lottery, which is motivated in Section 2.2. This difference cannot be attributed to self-regarding preferences overriding other-regarding preferences. Getting back to the literature comparison, the findings of our research also do not match the notion that limited liability payment systems lead to excessive risk taking of money managers on behalf of clients (Allen & Gale, 2000; Allen & Gorton, 1993; Rajan, 2006). A plausible reason for this is the size of the bonus in this research. This is discussed in next subsection.

3.3: Limitations

This section elaborates on important limitations of this research and gives recommendations for future research.

Treatments design. This experimental design compares a frequent treatment with an infrequent treatment to examine MLA when investing for others. It would have been optimal to disentangle the potential MLA-effect in an information feedback effect and decision binding effect. However, this would have led to twice as many treatments.[15] Financial constraints did not allow for this. Existing research is consistent in finding treatment differences between a frequent and infrequent treatment, but is not when disentangling the information feedback and decision binding effect. This experimental design, therefore, seemed logical. A gap in the literature thus remains to be filled: disentangling MLA when investing for another.

Stake size. Stake sizes in this experiment are low compared with those of real-world decision makers. This makes it hard to extrapolate these findings to reality. This limitation is common with experimental research. The following is a limitation specific to this research. The potential winnings of fund managers in the investment task were low compared with the clients' potential winnings via the investment task. It was also low compared with the fixed

[14] Significance of treatment differences is not investigated, since it is regarded as irrelevant.

[15] Some MLA research excludes a treatment with performance feedback every 3 rounds and decision binding every round, because it is an odd investment scenario. Adhering to this still leads to 1.5 times as many treatments.

show-up fee the fund manager received. This is explained in more detail in Appendix B. This specific low stake size for fund managers matters. Observation 2b implies that self-regarding preferences did not override other-regarding preferences. This is understandable with the low stakes for the fund manager. More research is needed on the link of convex bonus systems and MLA of fund managers to establish a well-founded picture of this. Preferably, research not subject to this specific limitation.

Inconsistent results. There is a general trend of inconsistent results in MLA literature. We were aware of this. We performed many robustness checks on our results. The same picture arises. Different plausible data filters and analysis techniques led to qualitatively other results. In our research, we chose one data filter and one analysis technique and reported on that in Section 3. An elaboration on estimated results with other data filters and other analysis techniques can be found in Appendix C.

4: Conclusion

Is MLA the explanation to the equity premium puzzle? This research aims to come one step closer to that answer. We investigate the effect of MLA under specific circumstances: with fund managers investing for clients absent bonus system and present bonus system. The first was investigated and confirmed by Eriksen and Kvaløy (2010b) with a Norwegian sample. This research makes use of a US sample. The second was not yet investigated. The results of our research indicate the following. Fund managers invest more for clients if they evaluate the investment infrequently, both absent and present bonus system. This is in line with prediction 1 and 2a. The assumptions of these predictions are: fund managers have other-regarding preferences over the clients' outcome and MLA over that. These assumptions are investigated as well. These assumptions are not falsified. However, this investigation does provide an alternative explanation for our results. This alternative explanation is other-regarding preferences over the others' wishes.

A notion on MLA is as follows. MLA appears a delicate research subject. Literature is not consistent about MLA (Bellemare et al., 2004; Fellner & Sutter, 2009; Langer & Weber, 2008). Minor design differences can lead to opposing results (Zeisberger, Langer, & Weber, 2012). Our research shows a similar picture. Our results are not robust to other plausible data filters and analysis techniques. Extra attention to experimental design and robustness checks are a way to handle this subtleness of MLA. We aimed to do this. A legitimate question is however: is such a subtle phenomenon able to explain such a puzzle?

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Appendix A: Inconsistent results of existing MLA literature

Table 5 displays treatment differences in investment of existing research disentangling the MLA effect when investing for oneself. Authors and year of publication of the respective research are mentioned in the left column. The grey shaded cells correspond to our experimental treatments in investigating MLA when investing for others, i.e. information feedback and binding every round versus every 3 rounds. Results on the main determinant of MLA when investing for oneself and the presence of an interaction effect are inconsistent.

Table 5

Title: Inconsistent results of existing literature about MLA when investing for oneself

	1F1B	1F3B	3F1B	3F3B
Bellemare et al. (2004)	59.5%	61.4%	-	71.1%
Fellner & Sutter (2009)	33.3%	64.8%	52.6%	56.6%
Langer & Weber (2008)	52.4%	74.2%	64.4%	65.5%

Notes. Average investment levels in percentages per treatment per research. *1F1B* is a treatment with feedback and decision binding per round. *1F3B* is a treatment with feedback per round and decision binding per 3 rounds. *3F1B* is a treatment with feedback per 3 rounds and decision binding per round. *3F3B* is a treatment with feedback and decision binding every 3 rounds.

Appendix B: Experimental design

This appendix provides descriptive statistics and elaborates on the control variables used in the regression models. Table 6 shows treatments and respective subject counts.

Table 6

Different treatments and subject counts

	Absent Bonus System	Present Bonus System
Per 1 Round: Feedback And Binding	F (27 : 27)	F+ (33 : 33)
Per 3 Rounds: Feedback And Binding	I (32 : 32)	I+ (32 : 32)

Notes. Different treatments and subjects per treatment. *F* is treatment frequent absent bonus system. *I* is treatment infrequent absent bonus system. *F+* is treatment frequent present bonus system. *I+* is treatment infrequent present bonus system. Post-data filter subject counts are in parentheses, respectively fund manager and client count. Pre-data filter subject count is *F* (33 : 33), *I*(35 : 35), *F*+(36 : 36) and *I*+(36 : 36).

The experiment was built with use of Qualtrics. This is commonly-used online survey building software. The experiment was distributed with use of Prolific under US citizens. This is online survey distribution platform. The experiment was carried out in two steps. The fund manager experiment was launched on July, 13, 2020. The client experiment was launched on July, 15, 2020. A client was randomly assigned to a fund manager and paid out what the fund manager earned for him/her. Hence, the role of the client was passive. The experiments were launched at 8 AM (UTC-4). This time zone is used in 23 Eastern states of the US.

Average completion time of the experiment was 399 seconds. All fund managers earned 1$ participation fee. Fund managers present bonus system earned $0.04 bonus on top of that on average. All clients earned $0.15 participation fee. All clients earned $0.95 on top of that on average. Hence, payment was more or less equal. This should exclude fairness effects.

Individual characteristics were elicited as control variables. Specifically: sex, age, field of study or work, highest finished education, financial literacy, self-reported risk preferences (Dohmen et al., 2011) and a social responsibility indicator (Berkowitz & Lutterman, 1968). There is no consensus on gender effects on MLA-behavior (Eriksen & Kvaløy, 2010b; Lee & Veld-Merkoulova, 2016). Age affects MLA-behavior (Glätzle-Rützler, Sutter, & Zeileis, 2015). Field of study or work seems to affect MLA-behavior (Eriksen & Kvaløy, 2010a; Haigh & List, 2005). Lee and Veld-Merkoulova (2016) suggest distinct effects of education and financial literacy on MLA-behavior. Self-reported risk preference measure provides the subjects' tendency to take risk. Social responsibility indicator provides the subjects' tendency to act socially instead of egoistically.

We include several experiment screens in this appendix. Figure 1 shows an experiment description screen of treatment *F+*. This is similar to the experiment description screen of treatment *F*, but includes the pay-off functions of the fund manager. This is similar to the experiment description screen of treatment *I+*, but here decision binding is per 1 round instead of 3 rounds. Figure 2 shows an outcome screen after round 9 of investment task of treatment *F+*. This is similar to the outcome screen of treatment *F*, but includes the pay-off of the fund manager. Figure 3 shows an outcome screen after round 9 of investment task of treatment *I+*. This is similar to the outcome screen of treatment *I*, but includes pay-off of the fund manager.

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Welcome to part 1 of the experiment.

You are a money manager. You invest money for a client (another real subject). You do this for 9 consecutive rounds. Each round, the client sends you 100 EC (experimental currency: 100 EC = 0.10 USD). Each round, you decide what amount of the 100 EC of your client you wish to invest for your client in a lottery.

The lottery is either won or lost. In case of a win, the client gets its invested amount back and in addition receives 2.5 times of the investment as gain. You receive 0.4 times of the investment as fee.

Payment in case of winning lottery:
Profit = 2.9 * Investment
Client = 100 + 2.5 * Investment
You = 0.4 * Investment

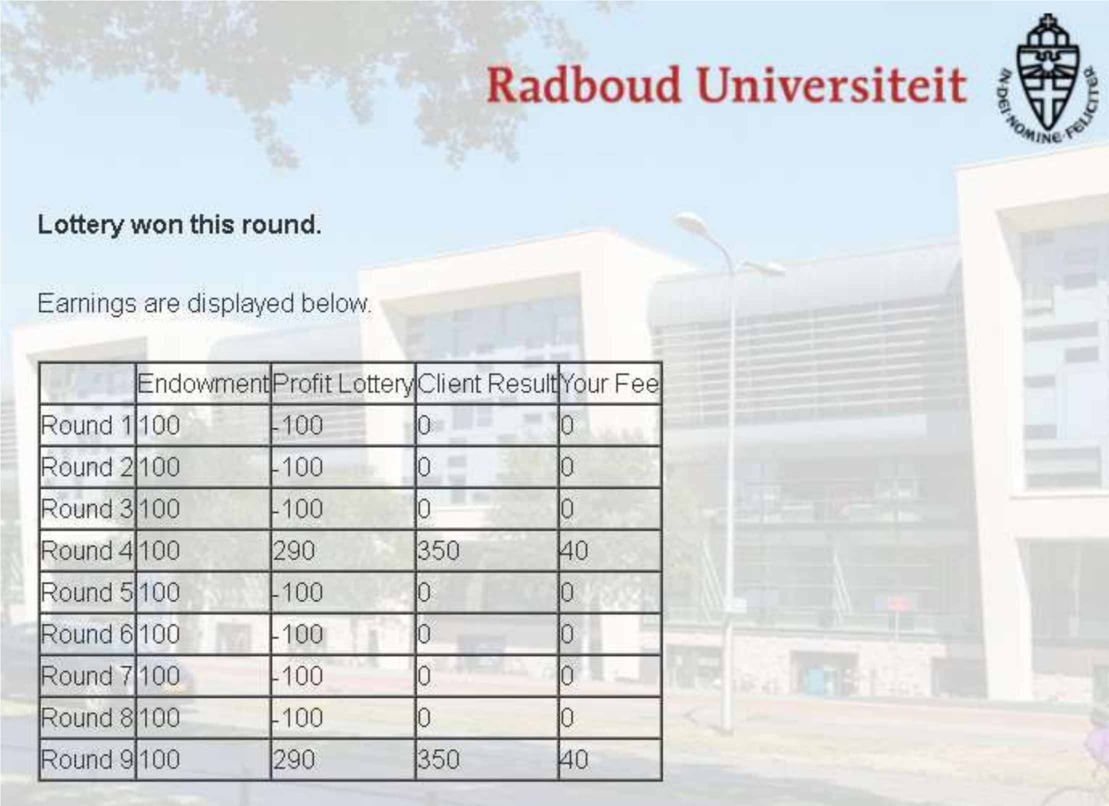
In case of a loss, the investment is lost and you receive no payment.

Payment in case of losing lottery:
Profit = -1 * Investment
Client = 100 - Investment
You = 0

Whether the lottery is won will be determined by the throw of a six-sided die at the end of each round. In case of a five or a six, the lottery is won, in case of a one, two, three or four the lottery is lost. The probability of winning the lottery is therefore 33.33%. The probability of losing the lottery is 66.67%. The result will be displayed after each round.

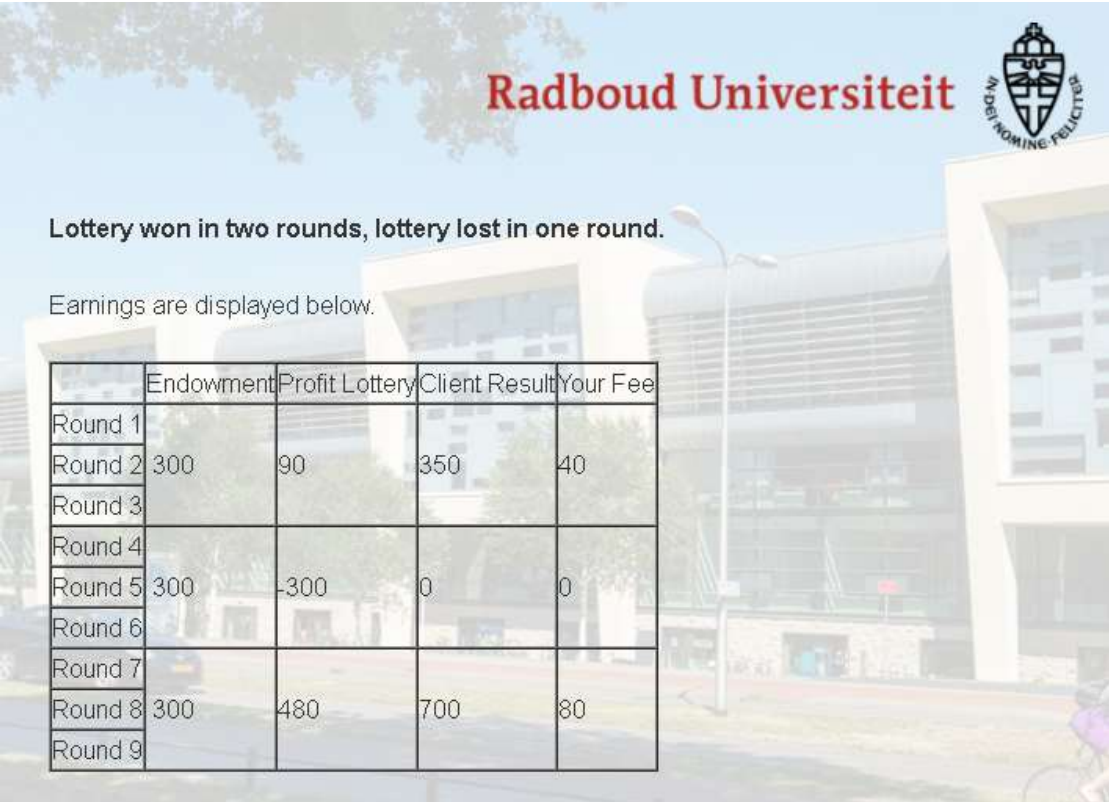
The role of the client is passive. The client only knows about his/her own total earnings after 9 rounds.

Figure 1: Experiment description of treatment *F+*



	Endowment	Profit Lottery	Client Result	Your Fee
Round 1	100	-100	0	0
Round 2	100	-100	0	0
Round 3	100	-100	0	0
Round 4	100	290	350	40
Round 5	100	-100	0	0
Round 6	100	-100	0	0
Round 7	100	-100	0	0
Round 8	100	-100	0	0
Round 9	100	290	350	40

Figure 2: Outcome screen after round 9 of treatment *F+*



	Endowment	Profit Lottery	Client Result	Your Fee
Round 1				
Round 2	300	90	350	40
Round 3				
Round 4				
Round 5	300	-300	0	0
Round 6				
Round 7				
Round 8	300	480	700	80
Round 9				

Figure 3: Outcome screen after round 9 of treatment *I+*

Appendix C: Robustness checks

The robustness of the experimental findings is examined with other plausible data filters and with other plausible analysis techniques. The correctness of assumptions of our predictions is examined as well. This will be discussed in that respective order. Table 7 and 8 show average investment levels, corresponding standard deviations and one sided Mann Whitney U-tests to investigate the significance of treatment differences absent and present bonus system. No data filter is applied here. The unfiltered data shows the following pictures. The systematic difference of investment between the infrequent and frequent treatments is not significantly different from zero absent bonus system (N=68, p>0.1). This observation holds over 9 rounds and per every 3 rounds. Furthermore, the same holds for the present bonus system treatments (N=72, p>0.1). Hence, the data filter generates substantial diversity in results. The data has also been tested with other plausible data filters, i.e. excluding subjects who were among the 10% fastest, 20% fastest, who scored 1 on a 5 points understanding scale (ranging from no understanding to understanding of experimental task) or who scored 1 or 2 on this scale, and combinations of the previous filters. We do not report all these results to keep this concise. However, the message is as follows. Some data filters generate results in line with hypotheses 1 and 2a, some in line with one of the hypotheses and some in line with neither of the hypotheses. So the results of our Section 3 are not robust to other plausible data filters.

Table 7

Investment Absent Bonus System – Mann Whitney U tests

Variable: Investment	Treatment *F*		Treatment *I*		MWU-test	
	Mean	SD	Mean	SD	z-value	p-value
Round 1-3	38.848	30.387	33.000	24.809	-1.0178	0.859
Round 4-6	39.393	33.082	40.485	29.057	0.747	0.227
Round 7-9	43.080	43.080	46.457	34.013	0.765	0.221
Round 1-9	40.441	32.617	39.980	30.210	-0.431	0.666

Notes. Average investment and standard deviations per 3 rounds and per 9 rounds without data-filter. The right 2 columns report the z-value and p-value of one sided Mann Whitney U-tests examining treatment differences. N=33 (N=35) for treatment *F* (*I*).

Table 8

Investment Present Bonus System – Mann Whitney U-Tests

Variable: Investment	Treatment *F*+		Treatment *I*+		MWU-test	
	Mean	SD	Mean	SD	z-value	p-value
Round 1-3	39.583	30.366	41.194	33.526	0.436	0.331
Round 4-6	42.546	32.982	44.666	30.445	0.799	0.211
Round 7-9	51.398	35.928	47.972	31.880	-0.615	0.730
Round 1-9	44.509	33.447	44.611	31.971	0.418	0.337

Notes. Average investment and standard deviations per 3 rounds and per 9 rounds without data-filter. The right 2 columns report the z-value and p-value of one-tailed Mann Whitney U-tests examining treatment differences. N=36 (N=36) for treatment *F*+ (*I*+).

Table 9 and 10 show the estimation results of an OLS and Tobit regression without and with control variables, respectively for absent bonus system and present bonus system treatments. The estimated results investigating MLA show the following picture. The effect of a treatment *I* dummy on investment absent bonus system is not significantly different from zero (N=531, p>0.1). This holds for OLS and Tobit regression without and with control variables. The same goes up with the effect of a treatment *I*+ dummy on investment present bonus system (N=585, p>0.1). So the results of Section 3 are not robust to other plausible methods of analysis. In this case, these methods are regarded inferior to non-parametric Mann-Whitney U-tests applied in Section 3. A skewness and kurtosis test has been applied to the residuals of the OLS and these are found to be non-normal. This is in conflict with the normality of residuals assumption of OLS. This hinders hypothesis testing with OLS.[16] Furthermore, the Mann-Whitney U test is commonly used in this strand of literature. Therefore, we chose to report these in Section 3. However, the message is as follows. Although regarded inferior, the deviance of these estimated results from the results in Section 3 show that MLA is very subtle to observe.

[16] A test of normality of residuals for Tobit regression is complex. Several test available implied left-censored Tobit regressions, whereas this research deals with right-censored Tobit regressions. Normality of residuals is not tested for the Tobit regressions.

Table 9

Investment Absent Bonus System - Regressions

Dependent Variable: Investment	OLS		TOBIT	
	(I)	(II)	(I)	(II)
I	2.219 (6.720)	4.966 (5.863)	1.356 (7.569)	4.522 (6.358)
General Risk Preference		-0.456 (2.591)		-0.443 (2.918)
Social Responsibility Score		3.771 (6.791)		3.146 (7.482)
Financial Literacy		5.693 (3.403)		6.470 (3.785)
Female		3.767 (7.127)		4.122 (8.050)
Age		-0.673*** (0.224)		-0.717 (0.250)
Education		-2.236 (2.968)		-2.251 (3.227)
Econ		-7.579 (10.503)		-9.254 (11.840)
Constant	37.238*** (4.971)	41.159 (44.373)	39.245*** (5.913)	46.122 (50.754)
N	531	531	531	531
(Pseudo) R^2	0.001	0.098	*(0.000)*	*(0.011)*
F Statistic	0.11	1.99*	0.03	1.85*

Notes. OLS-regression and TOBIT-regression without and with control variables, respectively columns (I) and (II). Variable *I* is a dummy of treatment infrequent absent bonus system. Standard errors are clustered at the individual level. Standard errors are in parentheses. N=531 corresponds to 531/9=59 subjects. Each individual invests for 9 rounds, i.e. provides 9 observations. (*=p<0.1, **=p<0.05, ***=p<0.01).

Table 10

Investment Present Bonus System - Regressions

Dependent Variable: Investment			TOBIT	
	(I)	(II)	(I)	(II)
I+	2.846	2.451	3.196	2.551
	(6.735)	(6.726)	(7.794)	(7.837)
General Risk Preference		1.575		1.714
		(2.123)		(2.476)
Social Responsibility Score		5.366		6.116
		(7.097)		(7.949)
Financial Literacy		-4.727		-5.433
		(3.271)		(3.761)
Female		-13.094**		-15.655**
		(6.236)		(7.175)
Age		0.527		0.593
		(0.358)		(0.415)
Education		-10.357*		-12.447*
		(5.681)		(6.630)
Econ		-17.919*		-20.932*
		(9.693)		(11.510)
Constant	43.851***	121.981***	46.492***	141.635***
	(4.763)	(34.543)	(5.660)	(41.834)
N	585	585	585	585
(Pseudo) R^2	0.001	0.125	*(0.000)*	*(0.015)*
F Statistic	0.18	2.90***	0.17	2.85***

Notes. OLS-regression and TOBIT-regression without and with control variables, respectively columns (I) and (II). Variable *I+* is a dummy of treatment infrequent present bonus system. Standard errors are clustered at the individual level. Standard errors are in parentheses. N=585 corresponds to 585/9=65 subjects. Each individual invests for 9 rounds, i.e. provides 9 observations. (*=p<0.1, **=p<0.05, ***=p<0.01).

Table 11 shows the estimation results of an OLS without and with control variables, respectively for absent bonus system and present bonus system. The estimated results investigating the relationship between beliefs and investment show the following picture. Fund managers' beliefs about their clients' investment wishes seem to significantly influence actual investment absent bonus system (N=59, p<0.01). The same holds present bonus system (N=65, p<0.01). The coefficient of fund managers' beliefs ranges from 0.578 to 0.603, depending on the model. In other words, there appears to be a substantial relationship between beliefs and actual investment. However, this result should be regarded with caution, as described in Section 3.

Table 11

Investment - Regressions

Dependent Variable: Investment	Absent Bonus System		Present Bonus System	
	(I)	(II)	(I)	(II)
Beliefs	0.578***	0.659***		
	(0.105)	(0.099)		
Beliefs+			0.603***	0.590***
			(0.100)	(0.103)
General Risk Preference		-1.766		-0.474
		(2.095)		(1.580)
Social Responsibility Score		-3.710		8.458
		(5.801)		(5.308)
Financial Literacy		7.547**		-0.422
		(3.289)		(3.192)
Female		-2.331		-12.341**
		(6.014)		(5.690)
Age		-0.510**		-0.001
		(0.233)		(0.364)
Education		-2.011		-6.482
		(2.341)		(4.750)
Econ		-14.409		-3.733
		(9.363)		(7.940)
Constant	18.172***	64.341*	20.705***	48.803
	(4.766)	(33.983)	(4.357)	(30.788)
N	59	59	65	65
R^2	0.359	0.535	0.414	0.494
F Statistic	29.98***	10.01***	35.96***	9.61***

Notes. OLS-regression without and with control variables, respectively columns (I) and (II), for absent and present bonus system. Dependent variable *Investment* is the average investment per subject per round. Variable *Beliefs* is the fund manager its belief about investment wishes of client in the absent bonus system treatments. Variable *Beliefs+* is the fund manager its belief about investment wishes of client in the present bonus system treatments. Standard errors are robust. Standard errors are in parentheses. (*=p<0.1, **=p<0.05, ***=p<0.01).