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## Am I my Peer's Keeper? Social Responsibility in Financial Decision Making

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## **Am I my Peer's Keeper? Social Responsibility in Financial Decision Making**

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Sascha Füllbrunn and Wolfgang J. Luhan<sup>1</sup>

# Am I my Peer's Keeper?

## Social Responsibility in Financial Decision Making

### Abstract

*Decision makers often take risky decisions on the behalf of others rather than for themselves. Competing theoretical models predict both, higher as well as lower levels of risk aversion when taking risk for others, and the experimental evidence is mixed. In our within-subject design, money managers have substantial responsibility by taking investment decisions for themselves and for a group of six clients, when payments are either fixed or perfectly aligned. We find that money managers invest significantly less for others than for themselves (cautious shift) which is mainly driven by a less risk averse sub sample. Digging deeper we find money managers to rather act in line with what they believe the clients would invest for themselves. We derive a responsibility weighting function to show that with a perfectly aligned payment the money manager weights egoistic and social preferences. Finally we bring our results in perspective with the mixed experimental literature.*

*JEL Classification: C91, D81, G11*

*Keywords: Financial decision making; social responsibility; decision making for others; risk preferences; experiment*

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# 1 Introduction

The vast majority of economic decisions involve certain levels of uncertainty about the outcome. Economic research on risk attitudes has traditionally focused on individual decision making issues, without any consideration for potential social influences on risk preferences (see e.g., Dohmen et al., 2011; Eckel and Grossman, 2008b; Harbaugh et al., 2010; Holt and Laury, 2002). As real world decisions are embedded in a social context, however, a decision maker is hardly ever the only person affected by the consequences of his actions. Indeed, many risky decisions do not only affect but are specifically taken on behalf of a third party. This third party might be the decision maker's family or a business partner; on a larger scale CEO's decisions affect a company or even an industry, and political decisions affect large parts of the population, a nation or beyond. On financial markets, investors usually put an agent in charge of his risky investments. During the financial crisis of 2007-2008 this practice in the financial sector became the subject of a continuing public as well as a scientific debate as it was perceived to lead to excessive risk taking (Allen and Gorton, 1993; Allen and Gale, 2000; Cheung and Coleman, 2014; Kleinlercher et al., 2014; Robin et al., 2011). Though responsibility in risky decisions has only recently been picked up in the experimental literature (see Trautmann and Vieider (2012) for a review and section 2). The results, however, provide no consistent answer concerning the question of whether decisions on behalf of others involve higher (risky shift) or lower (cautious shift) levels of risk as compared to decision for oneself.

The terms “risky shift” and “cautious shift” were introduced by Stoner (1961) to describe situations where the initial, individual level of risk preference is altered due to exogenous impacts. In the case of responsibility the resulting shift could be in both directions. In the psychological literature, a prominent explanation for a risky shift is the “psychological self-other distance” (e.g., Beisswanger et al., 2003; Cvetkovich, 1972; Stone and Allgaier, 2008; Trope and Liberman, 2010; Wray and Stone, 2005) in which the evaluation of a potential loss in a risky situation is decreasing in the distance to the decision maker. This finding translates directly to the results from economic experiments (e.g., Harrison, 2006; Holt and Laury, 2002, 2005), as risk aversion is significantly decreased in hypothetical situations without real consequences in the laboratory<sup>1</sup>. Further support for this finding comes from neuro-economics. Albrecht et al. (2011) find that making inter-temporal decisions for others result in lesser activation of areas of the brain that are thought to be engaged in emotion and reward-related

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<sup>1</sup>Noussair et al. (2014) find barely a difference between hypothetical and incentivized risk elicitation techniques using lotteries. Though in their study they considered the difference within the online subject pool, but not in the laboratory.

processes than when taking decisions for oneself.

The resulting argument would be that decisions made on behalf of a third party are equivalent to situations without any real outcome. In contrast, Charness and Jackson (2009) propose “responsibility alleviation” (Charness, 2000) as an explanation for a cautious shift. According to this theory, taking responsibility for a third party’s welfare induces pro-social behavior which results in conservative risk taking (Charness, 2000; Charness and Jackson, 2009). Though pro-social behavior can also mean that the decision maker tries to match the will of the others.

Despite prominent examples of a risky shift in financial markets due to limited liability of money managers (e.g., Allen and Gorton, 1993), there are several empirical observations on cautious shift behavior. Physicians, for example, have been found to prefer treatments with higher mortality rates for themselves than what they recommend to their patients (Garcia-Retamero and Galesic, 2012; Ubel et al., 2011). Managers try to avoid responsibility for decisions with even a minimal probability of hazardous outcomes (Swalm, 1966; Viscusi et al., 1987).

We study the effect of responsible financial decision making for others using a series of economic laboratory experiments. We first discuss design features from previous studies that might have triggered certain directions of investment shifts, i.e. increased risk taking for others (risky shift) or decreased risk taking for others (cautious shift). We then implement an experimental design that controls for these potential confound effects. In contrast to the literature, we consider a design with high responsibility (six clients) in a situation with and without payoff alignment of the decision maker. We discuss several behavioral theories that might explain the conflicting results in the literature.

In our experiment, an individual decision maker (henceforth “the money manager”) faces a risky investment situation similar to Gneezy and Potters (1997). In our three treatments the money manager either invests only for himself, only for a group of six other subjects (henceforth “the clients”) without any monetary relevance for himself (no payoff alignment), or he invests an equal amount for the clients and for himself (payoff alignment). This enables us to systematically study the effect of social responsibility on risk aversion as well as the effect of possible differences between the money manager’s and his clients’ risk preferences. We found the existing literature to equalize two profoundly different situations, one in which the money manager’s payoff is perfectly aligned with the clients’ payoff, i.e., the money managers take the same risk, and one in which the money manager’s payoff is independent of his investments. Our study is the first to systematically compare these theoretically very different situations and to attempt to identify a unifying behavioral explanation for the mixed results in the literature.



Our aggregate results indicate investment behavior to be in line with responsibility alleviation as the money managers invest significantly less when clients bear the consequences even when the money manager's payoff depends on his investment. However, this cautious shift is purely driven by money managers with low levels of risk aversion. For money managers with high levels of risk aversions, we find indications for a risky shift. Apparently, when making decisions for others the money managers try to act according to the clients' risk preferences. Eliciting the money manager's beliefs about the clients' propensity to invest from themselves, we indeed find that money managers on average invest an equal amount for their clients they believe the clients would invest for themselves. In the case of payoff alignment, we find that the difference between his own risk preference and the perceived risk preferences of the group determines the decision. We fit a weighted preference function to our data allowing us to determine the level of altruism of our subjects. On average the money managers display a significant amount of responsibility. However, they assess their individual preferences to be more important than those of the six clients.

## 2 Literature Review

There is a small, yet growing body of literature on risky decision making for others with rather mixed results (find an overview in table G.10 in the online supplement). A number of studies find evidence for a *risky shift*, i.e. money managers take a significantly higher risk for others than for themselves. Chakravarty et al. (2011) find that subjects tend to be less risk averse when deciding for others, using a first price sealed bid auction against computer bidders as well as a multiple price list. They conclude that decision makers display social preferences when deciding for others but also argue, though do not test, that decision making for others is not different from hypothetical risk taking. Results from a multiple price list design in Andersson et al. (forthcoming), though insignificant, suggest rather a risky shift. Using structural estimation they argue that loss aversion is reduced when investing for others. Polman (2012) finds a risky shift when considering a multiple price list in his third study.<sup>2</sup> Using the Gneezy and Potters (1997) investment game with repetition, Pollmann et al. (2014) and Sutter (2009) find a significant risky shift.<sup>3</sup>

In contrast, a *cautious shift*, i.e., money managers take significantly lower

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<sup>2</sup>One needs to be careful when interpreting the results in Polman (2012). The incentives for the decision maker are not salient and a part of the reported experiments involve deception.

<sup>3</sup>In PAY-COMM, a team consisted of three members. One member needed to make a decision for the first three periods, a second member for the second three periods, and the last member for the last three periods. While the first member showed no shift at all, the second and the third showed a significant risky shift.

risks for the clients than for themselves, has been found by an even larger number of studies. In Reynolds et al. (2009) the money manager decides between a safe and a risky choice for himself first, and subsequently for each individual in a group of clients (three to five subjects). They find the number of safe choices to be in general higher for others than for the money manager himself. Eriksen and Kvaløy (2010) replicate the experiment from Gneezy and Potters (1997) but added a treatment in which money managers invest the endowment of one client only. Investments are significantly lower when investing for clients than when investing for the money manager himself. As a control they reran the treatment with hypothetical clients and found investment levels to be significantly higher.<sup>4</sup> Montinari and Rancan (2013) used a similar version to Eriksen and Kvaløy (2010) but with lotteries yielding a negative expected return. Still the money managers invested more for themselves than for their clients, especially if the client was a friend of the money manager. Charness and Jackson (2009) consider strategic risk taking in the stag-hunt game in which two players choose either stag (risky) or hare (risk-less). They report lower numbers of stag-plays when the payoff consequences are shared with another subject, concluding that their result is in line with a responsibility alleviation effect (Charness, 2000). In the first setting of Bolton and Ockenfels (2010) subjects choose between a risky choice and a safe choice for oneself and others or only for others. They find a cautious shift with the number of safe choices being lower for others than for oneself only. They suggest a tendency to take conservative risk when one's choice affects other people's welfare. Bolton et al. (2015) find further evidence in line with this suggestion using a multiple price list design.

Using a battery of lotteries and similar decisions for oneself and a third party, Pahlke et al. (2012) provide evidence for a risky shift in the loss domain and a cautious shift in the gain domain for moderate probabilities; and a reversal for small probabilities. They conclude that their results “*discredits hypotheses of a 'cautious shift' under responsibility, and indicates an accentuation of the fourfold pattern of risk attitudes usually found for individual choices*” (p.22). Finally Humphrey and Renner (2011) using a multiple price list find no significant shift at all.

Thus, the evidence is as mixed as are the experimental designs. Although describing a (largely) similar situation, the studies mentioned differ in various aspects. With the oppositional findings of a risky as well as a cautious shift, the obvious conclusion is that the differences in design might be driving the differing results. Our approach is therefore to identify confounding factors and

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<sup>4</sup>The result in Eriksen and Kvaløy (2010) is further evidence for the effects of self-other distance in risky decisions (e.g., Beisswanger et al., 2003; Cvetkovich, 1972; Stone and Allgaier, 2008; Trope and Liberman, 2010; Wray and Stone, 2005). More importantly it indicates that this will produce results similar to hypothetical decision making (e.g., Harrison, 2006).

systematically exclude or control them in our experimental design.

*The “Others”.* All studies listed above consider “*risk taking for others*” and focus on the difference between making a decision for oneself (henceforth OWN) and making the same decision for a client. There is, however, an important variation in the payoff alignment between money managers and clients. Either the money manager decides for the clients only and earns a lump sum payment (henceforth OTH - decision for clients only)<sup>5</sup>, or the money manager has to invest the same amount as the clients, i.e., money manager and clients take the same risks (henceforth LEA - same decision for oneself and clients).<sup>6</sup> Although these situations are obviously not similar, as the own consequences differ, the previous literature has exclusively considered either OTH or LEA when considering decision making for others.<sup>7</sup> Standard models of rational behavior make clear predictions on risk taking in LEA. In this case, egoistic preferences play the main role and investments in OWN are not distinguishable from investments in LEA.<sup>8</sup> In OTH there is no standard-theoretical prediction as the decision for others has no monetary impact in for money manager’s payoff (Eriksen and Kvaløy, 2010). We implement both treatments along with the decision for oneself in a within-subjects design, to examine whether money managers in LEA invest in a rather selfish manner (LEA=OWN) or rather in line with what they would for the others only (LEA=OTH).

*Responsibility.* Apart from Sutter (2009)<sup>9</sup> the previous studies consider decision making for one client only. We expand the responsibility for the money manager as each has to manage a 54-Euro-fund for six clients. According to responsibility alleviation (Charness, 2000; Charness and Jackson, 2009) the effects of responsibility should be increasing in the number of affected parties. Therefore, any effects observed in previous studies, should be amplified in our setting.

*Accountability.* Accountability, i.e., the fact that the money managers can be blamed for their decision, has been shown to be an important factor when making risky decisions for others. Pollmann et al. (2014) provide evidence for a reduction in risk taking for others under accountability. This might also hold true for implicit accountability in the sense that the clients are able to

<sup>5</sup>Studies comparing OWN with OTH are Eriksen and Kvaløy (2010); Chakravarty et al. (2011); Reynolds et al. (2009); Polman (2012); Andersson et al. (forthcoming); Montinari and Rancan (2013); Pollmann et al. (2014). See tableG.10 in the online supplement.

<sup>6</sup>Studies comparing OWN with LEA are Charness and Jackson (2009); Sutter (2009); Bolton and Ockenfels (2010); Humphrey and Renner (2011); Pahlke et al. (2012); Andersson et al. (forthcoming); Bolton et al. (2015), see tableG.10 in the online supplement.

<sup>7</sup> Andersson et al. (forthcoming) conduct experiments on both OTH and LEA but do not discuss theoretical consequences nor do they compare the observed differences between OTH and LEA.

<sup>8</sup> Note that ex ante or ex post fairness plays no role as the money manager and the client receive the same payoff.

<sup>9</sup>A LEA setting in which the money manager has to decide for a group of three.

observe the money manager's decision albeit they do not know the identity of the money manager (Eriksen and Kvaløy, 2010). In this light, accountability could have affected the results of Reynolds et al. (2009) as the decision was openly announced to the group. Obviously, this holds as well in decisions made for a friend (Humphrey and Renner, 2011; Montinari and Rancan, 2013). To rule out accountability as a confounding effect, our clients are not able to infer the identity of a money manager nor are they able to observe the decision during the decision making process.

*Repetition.* Sutter (2009) as well as Eriksen and Kvaløy (2010) consider the Gneezy and Potters (1997) investment game with repetition. Here, money managers were not only able to experience the game. They are also able to accumulate wealth and may thus adjust their behavior according to gains or losses in earlier rounds. Interestingly, the first study (LEA) finds a risky shift and the second (OTH) finds a cautious shift. One reason might be the difference in the design. While in Eriksen and Kvaløy (2010) one money manager decides in all periods, in Sutter (2009) group members took turns in making decisions for the group every three periods. Implicit accountability might explain these differences as the clients were able to observe the decisions of the money manager. However, in our design the clients have to bear consequences of only one decision by the money manager, i.e., money managers were not able to diversify across periods.

*Anchoring.* In Reynolds et al. (2009), the money manager first made a decision for himself, observed the results of his investment, and then made a decision for the others. The feedback for the first decision, however, alters the information set for the subsequent decision. This situation could trigger psychological anchoring effects such as gamblers fallacy or hot hand belief (see e.g., Huber et al., 2010). In Sutter (2009), each decision taken was observed by the whole group, so even if the decision maker took his first turn, his decisions were influenced by the observations of previous outcomes. This procedure might explain the observation of decreasing risk aversion over the nine subsequent decisions. In our design, the participants receive information on the outcome of their investment only at the end of the experiment, thereby keeping the information set in all decisions constant.

*Order effects.* Most of the studies consider a between-subjects design. But Montinari and Rancan (2013) consider a within-subject design replicating Eriksen and Kvaløy (2010), though with a negative expected period return. The sequence of action was as follows. Money managers first invested twelve times for themselves (OWN), followed by twelve investments for others (OTH), and twelve investments for friends (OTH). Thus, learning over 36 repetitions alone might lead to a reduction in risk taking. However, Montinari and Rancan (2013)

conclude to observe a cautious shift comparing the treatments. Unfortunately, they cannot rule out experience as a confound effect as they did not control for order effects. We consider a within-subject design as well, but control for order effects by implementing an AB/BA design.

*Self-other distance.* A further argument for different results might be explained by self-other distance. Among others, Eriksen and Kvaløy (2010) show that investments for hypothetical clients lead to significantly higher risk taking than for real clients in the laboratory. However, Andersson et al. (forthcoming) find no significant differences when comparing a hypothetical risky decision and a risky decision with an effect for others in an internet experiment with higher social distance. These results indicate that laboratory experiments seem to increase the perception of making decisions for real clients (closer social distance) not for a potentially hypothetical ones in the internet (higher social distance).

*Fairness.* Finally, one might argue that fairness preferences play a role when payments for the money managers are fixed or known beforehand in OTH as for example in Eriksen and Kvaløy (2010), Reynolds et al. (2009) or Chakravarty et al. (2011). A money manager receiving a small fixed payoff might make smaller investments for his clients if he perceives that high investments might create payoff inequalities to his disadvantage. Reversely, a high fixed payoff might induce a money manager to make high investments for his clients. To control for this issue, we varied the fixed payoff for the money manager when investing for his clients (OTH). In one setting, the money manager earns the lowest and in a second setting the highest possible payoff the clients could achieve.

To sum up, we design a situation in which a money manager makes a risky investment for six clients. His payoff is either perfectly aligned with the clients' payoffs (LEA) or not aligned at all (OTH). We do not consider incentive compatible contracting in a principal-agent relationship, but focus on the pure effect of responsibility for a third party. We control for fairness issues, concerning the allocation of resources (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002, 2005), and ex ante and ex post fairness considerations (see Fudenberg and Levine, 2012), exclude accountability, and test for order effects. Finally, we do not consider competition among money managers as in Agranov et al. (2014) but focus purely on changes in risk taking when making investment decisions for others.

## 3 Design and Procedure

### 3.1 Treatments

We consider the Gneezy and Potters (1997) investment setting as the “*relative simplicity of the method, combined with the fact that it can be implemented with one trial and basic experimental tools, makes it a useful instrument for assessing risk preferences*” (Charness et al., 2013, p. 45).<sup>10</sup> In our baseline treatment (OWN), each subject is endowed with 9 Euro and is asked to decide on the amount to invest in a risky asset. With a probability of 2/3 the amount invested is lost and with a probability of 1/3 the investment earns a return of 250 percent. For  $X \in \{0, 9\}$  being the amount invested, the payoff was either  $\pi^{\text{OWN}} = 9 - X$ , in case of a loss, or  $\pi^{\text{OWN}} = 9 + 2.5 X$ , in case of a win.

In treatment OTH, subjects are organized in groups of seven, consisting of six passive members, the *clients* ( $c$ ), and one active member, the *money manager* ( $m$ ). Each client, is endowed with 9 Euro and the money manager decides on the amount to invest in the risky asset for each of the six clients. The amount invested is identical for all clients. The payoff for each client is either  $\pi_c^{\text{OTH}} = 9 - X$ , in case of a loss, or  $\pi_c^{\text{OTH}} = 9 + 2.5 X$ , in case of a win. The payoff for the money manager in any case is  $\pi_m^{\text{OTH}} = 0$ , which is common knowledge. To control for possible effects due to fairness preferences (see section 2) we also implement a treatment in which the money managers payoff was  $\pi_c^{\text{OTH}} = 31.5$ , which is, again, common knowledge.

In treatment LEA, we implement the same group protocol as in OTH. In contrast to OTH, all subjects *including* the money manager, are endowed with 9 Euro. The money manager decides on the amount to invest for each of the six clients *and* for himself. The amount invested is identical for all group members. The payoff is either  $\pi_c^{\text{LEA}} = \pi_m^{\text{LEA}} = 9 - X$ , in case of a loss, and  $\pi_c^{\text{LEA}} = \pi_m^{\text{LEA}} = 9 + 2.5 X$ , in case of a win, for all group members including the money manager.

### 3.2 Implementation

The experiment was conducted at the Ruhr-University Bochum experimental laboratory (RUB $\epsilon\chi$ ). The experiment was programmed and conducted with the software z-Tree (Fischbacher, 2007). We administered a within-subject design as subjects made their decision in each of the three treatments. Upon arrival subjects were randomly placed at computer terminals separated by blinds.

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<sup>10</sup>Note that risk-neutral (and, in turn, risk-seeking) individuals should invest their entire endowment. Hence, this method cannot distinguish between risk-seeking and risk-neutral preferences. Though usually only a fairly small fraction of participants choose to invest the entire amount. The amount invested provides a good metric for capturing treatment effects and differences in attitude toward risk between individuals. See Charness et al. (2013) for a detailed discussion.

In each treatment, instructions were read aloud and questions were answered privately. The experiment only started once we were sure all participants had comprehended the instructions. Once the treatments started, subjects were endowed with an on-screen calculator where they could enter arbitrary investment levels. The calculator would display a list containing all entered investment levels, the respective own payoff and (in case of OTH and LEA) the clients payoff in case of a loss and in case of a win.<sup>11</sup> Subjects subsequently chose one investment level from the generated list and confirmed their choice. To exclude repetition effects, participants were only informed that the experiment would consist of three independent parts, without specifying the exact nature of each part upfront. The instructions for each part were distributed only after the previous part was concluded. Subjects did not receive any feedback on their decisions until the end of the experiment.<sup>12</sup> After the last treatment, subjects had to answer a short debriefing questionnaire.

In the OTH and LEA treatments, each subject first made an anonymous investment decision in the role of a money manager for each of the six clients in the group (OTH) or for the whole group including himself (LEA). But at the end of the experiment, the investment decision of only one randomly drawn money manager in a group was binding for all group members. This procedure was common information. To avoid accountability effects, we guaranteed anonymity. Neither the money managers knew the identity of the clients nor did the clients know the identity of the money manager. We informed the subjects that only one of three treatments is payoff relevant. At the end of a session, we threw a dice to determine the payoff relevant treatment and we threw a dice for each group to determine whether the investment was successful or not. Subjects were paid privately and in cash and left the lab.

We ran 15 sessions with a total of 175 participants. Our participants were mostly bachelor students from all departments of the Ruhr-University Bochum. Subject participated only once in this experiment. We implemented three different setups. In setup one (70 observations), the treatment order was OTH-OWN-LEA. In setup two (70 observations), the treatment order was LEA-OWN-OTH. In setup three (35 observations), we reran setup one but the money manager earned the highest possible amount, i.e.,  $\pi_m^{OTH} = 9 + 2.5 \times 9 = 31.50$  Euro (which was also common knowledge). Comparing setup one to setup two we find no order effect and comparing setup one to setup three we find no effect on the payment condition.<sup>13</sup> Thus, we pool the data and end up with 175 independent observations. For those who are interested in gender effects, we provide a short

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<sup>11</sup>A short description on how subjects decided including a screenshot can be found in the online supplement section E.

<sup>12</sup>Find instructions in the online supplement in section F.

<sup>13</sup>We provide test results in the online supplement section A.

analysis in the online supplement showing that decisions do not significantly differ comparing male and female money managers. Average payments were 15.60 Euro (max. 34.5, min. 3) including a show-up fee of 3 Euro for the duration of roughly half an hour.

### 3.3 Hypotheses

We are not interested in individual investments for oneself (OWN) but rather in the shift of investments comparing OWN and OTH, and OWN and LEA respectively. Standard models of perfectly rational, egoistic agents make no predictions about situations like OTH as the payment for the money manager is not aligned to the investment decision (e.g., Eriksen and Kvaløy, 2010). Eriksen and Kvaløy (2010) as well as Andersson et al. (forthcoming) pick up the self-other distance hypothesis arguing that loss aversion is less pronounced when deciding for others than when deciding for oneself in line with the self-other distance, i.e.,  $X_{OWN} < X_{OTH}$ . The social responsibility hypothesis, however, argues that money managers behavior - driven by responsibility alleviation (Charness, 2000; Charness and Jackson, 2009) - will be more conservative when investing for others, i.e.,  $X_{OWN} > X_{OTH}$ . When the money manager believes his clients to have similar risk preferences as himself, he would, in line with the false consensus effect (Ross et al., 1977), invest the same amount for himself and for the clients, i.e.,  $X_{OWN} = X_{OTH}$ . In contrast, the self-others discrepancy effect states that money managers evaluate their own risk preferences differently than the risk preferences of their clients (Hsee and Weber, 1997; Eckel and Grossman, 2008a; Leuermann and Roth, 2012). Thus, the predicted shift depends on the risk attitudes of the money managers relative to their clients. If money managers believe the clients to be relatively risk averse, they would invest less for the clients than for themselves ( $X_{OWN} > X_{OTH}$ ), while money managers who believe the clients to be relatively risk seeking, would invest more for the clients than for themselves ( $X_{OWN} < X_{OTH}$ ). This could be one possible explanation for the mixed results in the literature. Studies finding a risky shift might simply feature a rather risk averse sample of the population, as studies reporting a cautious shift might by chance have a sample of rather risk loving money managers. To our knowledge, this has not been examined in the previous literature so far.

In contrast to OTH, rational models make clear predictions on risk taking in LEA. Excluding other-regarding preferences, decisions in OWN and LEA should not differ, i.e.,  $X_{OWN} = X_{LEA}$ . However, when the money manager's payoff is perfectly aligned with the clients' payoffs, egoistic preferences will be opposed by any social preference theory following the same predictions as for OTH. Thus, when the social preferences for clients completely crowd out the egoistic



preferences of the money manager there is no difference to the situation without payoff alignment, i.e.,  $X_{\text{LEA}} = X_{\text{OTH}}$ . When both preferences play a role, we hypothesize the investments in LEA to be in-between investments in OWN and OTH, i.e., either  $X_{\text{OWN}} \geq X_{\text{LEA}} \geq X_{\text{OTH}}$  or  $X_{\text{OWN}} \leq X_{\text{LEA}} \leq X_{\text{OTH}}$ . Note that the interaction of social and/or egoistic preferences in risky decision making can only be studied when all three treatments are considered in a within-subjects design.

## 4 Results

### 4.1 Risky or Cautious Shift?

Do the data show a risky shift or a cautious shift when making risky decisions for others? To answer this question, we compare each subjects investment in LEA ( $X_i^{\text{LEA}}$ ) and OTH ( $X_i^{\text{OTH}}$ ) to the investment in OWN ( $X_i^{\text{OWN}}$ ) by calculating the shift in investments, i.e.,  $S_i^{\text{LEA}} = X_i^{\text{LEA}} - X_i^{\text{OWN}}$  and  $S_i^{\text{OTH}} = X_i^{\text{OTH}} - X_i^{\text{OWN}}$ , as the relevant unit of observation. Note that negative values indicate a cautious shift and positive values indicate a risky shift. The second column in table 1 provides averages of investments and shifts for 175 independent observations.

Table 1: Average Investments in Euro

	all (175)	high risk (81)	low risk (94)
$X^{\text{OWN}}$	4.55 (2.43)	6.67 (1.76)	2.72 (1.05)
$X^{\text{LEA}}$	3.98 (2.02)	5.39 (1.87)	2.77 (1.19)
$X^{\text{OTH}}$	3.90 (2.22)	4.97 (2.24)	2.99 (1.75)
$S^{\text{OTH}}$	-0.65*** (2.39)	-1.71*** (2.68)	0.27 (1.63)
$S^{\text{LEA}}$	-0.57*** (1.59)	-1.29*** (1.95)	0.04 (0.78)
$S^{\text{OTH}} - S^{\text{LEA}}$	-0.07 (1.84)	-0.42* (2.10)	0.22 (1.53)

*Notes.* The second column contains all observations, *high risk* reports observations for subjects investing above the median (4) in OWN, *low risk* reports observations for subjects investing below or at the median in OWN. The last three rows contain the shift between investments in OTH and OWN ( $S^{\text{OTH}} = X^{\text{OTH}} - X^{\text{OWN}}$ ) and between LEA and OWN ( $S^{\text{LEA}} = X^{\text{LEA}} - X^{\text{OWN}}$ ). Standard deviations reported in parentheses. The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that  $S$  equals zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ .

Since the average investments in OWN (4.55 Euro) exceed average investments in OTH (3.90 Euro), we can confirm a significant cautious shift which is on average at  $S^{\text{OTH}} = -0.65$  (Wilcoxon signed-rank test,  $p < 0.001$ ).<sup>14</sup> Turning

<sup>14</sup>None of the relevant variables is normally distributed according to the Shapiro-Wilk Test for normality (all p-values are below 0.001). Thus, we make use of non-parametric tests

to a situation in which egoistic preferences may play a role, we again confirm a significant cautious shift which is on average at  $S^{\text{LEA}} = -0.57$  (Wilcoxon signed-rank test,  $p < 0.001$ ) as in LEA the average investment drops to 3.98 Euro. Thus, we state observation 1.

**Observation 1.** *Money managers invest significantly less for their clients than for themselves; independent of whether their payments are aligned with the clients payment.*

This result is a clear indication of acting in line with the social responsibility hypothesis. We find a significant cautious shift, not only in OTH but also in LEA, which is in contrast to the prediction of the standard rationality models.

The self-other discrepancy can be seen as a refinement of social responsibility as the money manager tries to act responsible by investing according to the investors risk preferences while deviating from his personal preferences. The direction and magnitude of the observed shift would depend on the perceived deviation of the money managers risk preferences from the average. To study this hypothesis, we split the whole sample of 175 observations in two groups: the *high risk* sample ( $h$ ), i.e., subjects who chose  $X^{\text{OWN}}$  above the median investment of 4.00 Euro, and the *low risk* sample ( $l$ ), i.e., subjects who chose  $X^{\text{OWN}}$  below or at the median investment. The second and third columns in table 1 provide aggregates of investments for the high risk sample and the low risk sample, respectively. The average investment in OWN in the high risk sample equals  $X_h^{\text{OWN}} = 6.67$  which is roughly 2.5 times higher than  $X_l^{\text{OWN}} = 2.72$  in the low risk sample. In the high risk sample, we find a significant cautious shift in OTH ( $S_h^{\text{OTH}} = -1.71$ ,  $p < 0.001$ ) and in LEA ( $S_h^{\text{LEA}} = -1.29$ ,  $p < 0.001$ ). In the low risk sample, however, we find qualitatively the reverse pattern as the shifts are positive in OTH ( $S_l^{\text{OTH}} = 0.27$ ,  $p = 0.348$ ) and in LEA ( $S_l^{\text{LEA}} = 0.04$ ,  $p = 0.723$ ); however, these differences are not significant.<sup>15</sup> Nevertheless, we conclude that the pattern suggested by the self-other discrepancy prevails in our observations. Thus, we state observation 2.

**Observation 2.** *In line with the self-other-distance theory, money managers with low risk aversion show a significant cautious shift, while money managers with a high risk aversion show an insignificant risky shift.*

In both samples the money managers seem to assume that their own risk preferences deviate from the average of the population. Thus, the decisions for their clients reflect a propensity towards the perceived average preference of

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although we consider 175 independent observations. We ran further regression which can be found in the online supplement.

<sup>15</sup>Excluding the median investors we find a weakly significant difference in OTH ( $S_l^{\text{OTH}} = 0.37$ ,  $p = 0.082$ ,  $n = 70$ ).

their clients. As the resulting risky shift of the low risk investors is smaller and insignificant, the cautious shift of the high risk investors is driving the aggregate results.

These conclusions are only derived from observed behavior under the assumption that money managers did indeed presume the average risk aversion to be higher or lower than their personal risk preferences. To test whether this assumption was correct or a mere artifact, we elicited the participants beliefs on the other participants investment levels in treatment OWN ( $EX_j^{\text{OWN}}$ ) in the debriefing questionnaire.<sup>16</sup> Table 2 depicts respective measures. The average difference between beliefs and own investment ( $EX_j^{\text{OWN}} - X^{\text{OWN}}$ ) is not significantly different from zero (Wilcoxon signed-rank test,  $p = 0.654$ ). This indicates that money managers on average do not believe others to take less or more risk than they take for themselves. These are only averages, however, displaying that the money managers have a clear perception of the sample populations risk preferences.

Table 2: Average Beliefs about Investments of Clients

	all (112)	high risk (49)	low risk (63)
$EX_j^{\text{OWN}}$	4.44 (1.56)	5.14 (1.65)	3.89 (1.24)
$EX_j^{\text{OWN}} - X^{\text{OWN}}$	-0.15 (2.27)	-1.68*** (2.27)	1.04*** (1.40)
$EX_j^{\text{OWN}} - X^{\text{OTH}}$	0.53** (2.51)	0.13 (2.98)	0.84*** (2.04)

*Notes.* Cells show averages for a sub-sample of 112 participants from which we elicited beliefs.  $EX_j^{\text{OWN}}$  denotes the beliefs about the investments of others in OWN. *High risk* reports observations for subjects investing above the median (4) in OWN, *low risk* reports observations for subjects investing below median in OWN. Standard deviations reported in parentheses. The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that  $S$  equals zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ .

On the individual level the investment in OTH can still deviate significantly from the expectation of the average risk preference. Thus, we again split the sample in the *high risk* and the *low risk* group along the median investment in OWN. And indeed, we find that money managers in the high risk sample believe others to invest significantly less than themselves ( $EX_j^{\text{OWN}} - X^{\text{OWN}} = -1.68$ ,  $p < 0.001$ ) while money managers in the low risk group believe others to invest significantly more ( $EX_j^{\text{OWN}} - X^{\text{OWN}} = 1.04$ ,  $p < 0.001$ ).

But to establish that money managers perceive their personal risk preferences differently than the population average is only the first step in testing the self-other discrepancy as a driving factor behind social responsibility. The next

<sup>16</sup>As we started to work on this question only after the first 63 observations had been collected, we can only use a sub-sample of 112 observations for this analysis. All results reported in this study remain unchanged whether we use the subsample or the full sample.

step is to uncover whether investments for the clients are in line with beliefs about what clients invest for themselves, i.e., whether  $EX_j^{\text{OWN}} - X^{\text{OTH}} = 0$ . Without splitting the sample, we find that money managers invest significantly less for clients than what they believe clients would invest for themselves ( $\Delta^{\text{OTH}} = 0.53$ ,  $p = 0.002$ ). However, this result is mainly driven by the low risk sample as we find the observed differences not to be significant in the high risk sample ( $EX_j^{\text{OWN}} - X^{\text{OTH}} = 0.13$ ,  $p = 0.676$ ) but highly significant in the low risk sample ( $EX_j^{\text{OWN}} - X^{\text{OTH}} = 0.84$ ,  $p < 0.001$ ). Thus, money managers in the high risk group roughly invest for their clients what they believe the clients would invest for themselves while the low risk group money managers invest less. Overall, we can say that money managers are relatively conservative in that they invest at most what they believe the others would invest for themselves.

**Observation 3.** *When investing for others without payoff alignment, money managers act according to their believed risk preferences of their clients.*

The high risk money managers had indeed expected to be above the average investment as had the low risk money managers expected to be below. More importantly we find the investments in OTH not to be different from what the high risk money managers believed their investors would invest for themselves. This again is a clear indicator for acting according to social preferences when there are no opposing individual incentives. This is in line with results from Bolton et al. (2015) who show that money managers act according to the clients preferences if information about the clients preferences was revealed beforehand.

Our design allows us to compare the investment shift when the payment is perfectly aligned and when the payment is not aligned. If the investments in both treatments were equal yet different to OWN ( $S^{\text{OTH}} = S^{\text{LEA}} \neq 0$ ) this would mean that the money managers ignore their own risk preferences. We find the cautious shift to be on average lower in LEA ( $S^{\text{LEA}} = -0.57$ ) than in OTH ( $S^{\text{OTH}} = -0.65$ ), though this difference is not significant using a Wilcoxon signed rank test. Only for the high risk sample we find the shift to be weakly significant higher in OTH than in LEA. The aggregate results suggest that the money managers ignore their own preferences to fully meet the clients needs.

**Observation 4.** *The investment shifts in LEA and OTH are not significantly different at the 5 percent significance level.*

This is a surprising result. The aggregate observations suggest not only that money managers feature social preferences but also that their individual risk preferences are overridden, once they decide for themselves *and* a group of clients. To examine the origins of this, rather counter intuitive, aggregate pattern, we look at individual behavior in the following section.

## 4.2 Responsibility weights

Apparently, in LEA the money managers deviate substantially from their own risk preferences and act rather in line with the risk preferences of the clients. This raises the question of how much weight is put on each of these opposing preferences when making an investment in LEA. Our experimental design allows us to model the relationship between individual risk preferences and the perceived risk preferences of the clients by considering the link-treatment LEA; the combination of OWN and OTH. If the money managers only care about themselves, we would predict  $X^{\text{OWN}} = X^{\text{LEA}}$  independent of  $X^{\text{OTH}}$ . Thus, the decision reflects the risk attitude of the decision maker only. If the money managers only care for the clients, we would predict  $X^{\text{LEA}} = X^{\text{OTH}}$  independent of  $X^{\text{OWN}}$ . And indeed the previous section indicates that on average  $X^{\text{OWN}} > X^{\text{LEA}} = X^{\text{OTH}}$ . Hence, the average money managers take responsibility for the clients and put their own needs in LEA on hold, as they are willing to reduce the investment levels for themselves in LEA in comparison to OWN. Whether a money managers “cares” more for himself or rather for the clients can be inferred by estimating a responsibility weight  $\alpha$  given by the relationship in (1).

$$X_i^{\text{LEA}} = (1 - \alpha_i)X_i^{\text{OWN}} + \alpha_i X_i^{\text{OTH}} \implies \alpha_i = \frac{S_i^{\text{LEA}}}{S_i^{\text{OTH}}}. \quad (1)$$

The interpretation is straight forward given  $S^{\text{OTH}} \neq 0$ . For  $\alpha = 0$ , the money manager cares only for himself which implies that  $X^{\text{LEA}} = X^{\text{OWN}}$ . For  $\alpha = 1$ , the money manager cares only for his clients and puts his own preferences to hold implying  $X^{\text{LEA}} = X^{\text{OTH}}$ . For  $0 < \alpha < 1$ , the money managers weights egoistic preferences and social preferences. Suppose a money manager opts for a cautious shift such that  $\alpha = 0.70$ . This indicates that the money manager takes the clients' risk preferences with a weight of 70 percent into account, and his own risk preferences with a weight of 30 percent. Table 3 provides aggregates for the responsibility weight  $\alpha$ .

Table 3: Responsibility Weight

	All		Cautious shift		Risky shift	
	# obs	Mean (sd)	# obs	Mean (sd)	# obs	Mean (sd)
All	94	0.36*** (0.37)	60	0.42 (0.38)	34	0.25*** (0.33)
$\alpha = 0$	37	0	21	0	16	0
$0 < \alpha < 1$	41	0.43* (0.18)	27	0.48 (0.17)	14	0.32*** (0.17)
$\alpha = 1$	16	1	12	1	4	1

*Note:* The table reports the average  $\alpha$  along with the standard deviation in line with equation (1), separated by cautious shift subjects ( $S^{\text{OTH}} < 0$ ) and risky shift subjects ( $S^{\text{OTH}} > 0$ ). \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  of two-sided Wilcoxon signed rank test that  $\alpha = 0.5$ .

We can calculate a valid  $\alpha$  if  $X^{\text{LEA}}$  is in-between  $X^{\text{OWN}}$  and  $X^{\text{OTH}}$  which is the case for 94 subjects.<sup>17</sup> Table 3 provides aggregates on the responsibility weight  $\alpha$  for all 94 subjects, and separated by types, i.e., the cautious shift types ( $S^{\text{OTH}} < 0$ ) and the risky shift types ( $S^{\text{OTH}} > 0$ ). In our sample the mean responsibility weight is 0.36 which again confirms the social preference motive of investments. However, this weight is significantly lower than 0.5 indicating that the preference of the money manager plays a larger role in his decisions than the preferences of the investors.

**Observation 5.** *Money managers take their client’s risk preferences into account when making decisions for both clients and themselves. However, their decisions depend more strongly on their own preferences.*

The average  $\alpha$  for money managers who display a cautious shift equals 0.43 which is not significantly different from 0.5 (Wilcoxon signed rank test,  $p = 0.150$ ). Money managers displaying a risky shift display have an average  $\alpha$  of 0.25 which is significantly lower than 0.5 (Wilcoxon signed rank test,  $p < 0.001$ ). Hence, risky shift types show a significantly lower  $\alpha$  than the cautious shift types (two-sided Mann Whitney U test,  $p = 0.039$ ). This indicates that the risky shift types take their own preferences stronger into account than the cautious shift types.

An explanation for these different patterns could be found in loss aversion. Cautious shift types are willing to reduce risk taking in LEA, i.e., to sacrifice potential earnings for oneself in order to reduce potential losses for the clients. In contrast, risky shift types need to increase risk taking in LEA to reach a similar  $\alpha$ . Consequently, they have to accept potentially higher losses to satisfy the pretended needs of the clients.

<sup>17</sup>In line with the false consensus effect, 39 participants chose the same investment in all treatments. For 42 subjects a weight cannot be calculated as either  $\alpha < 0$  or  $\alpha > 1$ .

## 5 Discussion and Conclusion

We study the effects of responsibility in risky decision making, using a one-shot Gneezy and Potters (1997) investment game while controlling for confounding effects detected in the literature. First, in line with responsibility alleviation, we find a significant cautious shift in risky decisions for others, irrespective of whether the decision makers payoffs are perfectly aligned with the clients or independent. Second, in line with the self-other-distance theory, we find that money managers invest in line with what they believe others would like to invest for themselves (in line with Bolton et al., 2015). In particular, money makers exhibiting low risk aversion make rather conservative investments for others, resulting in a cautious shift, while highly risk averse money managers take higher risks for their clients, resulting in a risky shift. Third, using a responsibility weighting model we find that cautious shift types take own preferences and the preferences of the clients about equally into account when making investment decisions in LEA. However, risky shift types overweight their own preferences as a higher weight for the clients would increase their own risk taking and potential losses.

But how can we explain the mixed results in the literature? In the following, we provide some suggestions in line with our results.

*Loss aversion for more than one other.* Previous studies have reported a risky shift and argue that reduced loss aversion due to a higher social distance explains the risky shift (e.g., Andersson et al., forthcoming). Thus, a reason for the difference in results might be that the argument holds if deciding for one client only. But it might be that *aggregated* loss aversion for *six* clients is greater than loss aversion for oneself leading to a cautious shift.<sup>18</sup> Hence, we ran further experiments in which the money manager invests for one client only as a robustness check (see section C in the online supplement). The results provide no indication for a risky shift either. We rather find that the results are qualitatively equal to the results in the experiments with six clients. We conclude that the level of responsibility does not alter our findings.

*Ambiguity Aversion.* While money managers might know their own preferences, they are uncertain about the clients' preferences; in particular when estimating the preferences of six clients. This creates an ambiguous situation when deciding for others in contrast to when deciding for oneself. From that point of view, our results are in line with ambiguity aversion as subjects take less risk in a situation with higher ambiguity (e.g., Trautmann and Van De Kuilen, forthcoming). This is even amplified as in the within-subject design subjects are

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<sup>18</sup>We thank participants from the ESA North American Meeting 2014 for raising this argument.

able to compare decisions for others and for themselves in line with *comparative ignorance* (Fox and Tversky, 1995).

*Risk attitude of the population.* The conclusions so far are based on aggregate results only, as is the case in the previous literature. Due to our within-subject design we are able to take the relative risk attitudes of the money manager into account. We find that the results are driven by the relatively risk seeking subjects, while for the relatively risk averse subjects we find rather a risky shift. Given our sample, the aggregate result of a cautious shift is driven by the group of high risk money managers. But any study with a rather risk averse subject pool would find an aggregate risky shift, of course. Hence, differences to for instance Andersson et al. (forthcoming) might be due to the fact that their subject pool is taken from the general Danish population which has been found to be more risk averse than the common student population (von Gaudecker et al., 2012).<sup>19</sup>

*Social Distance.* Among others, Eriksen and Kvaløy (2010) report that hypothetical decision making for others - the most extreme social distance - leads to higher risk taking in comparison to a situation with monetary consequences. Thus, experiments with higher social distance, as is the case for internet experiments in as compared to laboratory experiments, might lead to higher risk taking for others. On the other hand our experimental design allows the potential money managers to put themselves into the position of the clients as with high probability the money manager becomes a client. This might lead to a higher empathy for the others leading to a rather cautious shift (as in the equal opportunity mode treatment in Bolton and Ockenfels, 2006).

*Domains.* The results from the literature suggest that the domain of the lotteries plays a relevant role. Lotteries in the loss domain or in the mixed domain seem to support a risky shift while lotteries in the gain domain support a cautious shift Pahlke et al. (e.g., 2012). In the Gneezy and Potters (1997) investment game, however, we cannot control the subject's perception of the game as we have no record of the editing phase (Kahneman and Tversky, 1979). When the endowment is integrated, the decision takes place in the gain domain only ( $9 + 2.5X$  vs.  $9 - X$ ). When the endowment is segregated, the decision takes place in the mixed domain ( $2.5X$  vs.  $-X$ ). Our results point to the former as we provide integrated outcomes on the decision screen which fosters a cautious shift (see section E in the online supplement).

What drives investments when payments are perfectly aligned (LEA): Egoistic preferences or social preferences? Unfortunately, the literature so far has

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<sup>19</sup>Another reason might be that the self-other distance is higher in internet experiments than in the laboratory. In the extreme case, online subjects might perceive the situation as hypothetical, which would lead to higher risk taking (Harrison, 2006; Eriksen and Kvaløy, 2010).



not considered the link between LEA and OWN on the one hand, and LEA and OTH on the other hand. These links, however, are quite important to answer the question, as it combines decision making for oneself only and decision making for others only in one decision. On average, we observe a cautious shift in LEA and OTH which is smaller in LEA than in OTH. Hence, in LEA the social preferences play a role but the money managers cannot be expected to fully disregard their own preferences. While this consideration is straight forward, we are (to the best of our knowledge) the first to directly compare these two situations. Using the decisions in OTH and in OWN as reference points, we are able to construct a weighed risk preference model allowing us to determine the individual responsibility weight of our participants. On average the money managers take not only their own risk preferences (egoistic preferences) into account but also the risk preferences of the clients (social risk preferences). Though they seem to weight their egoistic preferences stronger than the social preferences. Casually speaking, in our experiments decisions in LEA depend on average by about 36 percent on social preferences and by 64 percent on egoistic preferences. This effect is even stronger for the risky-shift managers. They have to accept higher losses for the *good* of the others while the cautious-shift managers have to only sacrifice potential earnings.

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# Online Supplement

## A Pool Data

To test whether an order effect has an impact on investment levels, we compare 70 observations in which subjects made investment decisions in the order OTH-LEA-OWN and 70 observations in the order LEA-OWN-OTH. First, we make use of a Mann-Whitney U test to evaluate the  $H_0$  that investment levels do not differ between orders. In neither treatment we can reject the  $H_0$  (OWN  $p = 0.474$ , LEA  $p = 0.770$ , OTH  $p = 0.375$ ). Second, we test the  $H_0$  that differences in investment levels between treatments do not differ between orders. Again, we cannot reject the  $H_0$  for either comparison ( $X^{\text{OWN}} - X^{\text{OTH}}$ ,  $p = 0.858$ ,  $X^{\text{OWN}} - X^{\text{LEA}}$   $p = 0.348$ ,  $X^{\text{OTH}} - X^{\text{LEA}}$ ,  $p = 0.154$ , ). To test whether the payment condition for the money manager in OTH has an impact on investment levels we compare 70 observations with a zero payment for the decision maker and 35 observations with a payment of 31.50 Euro for the decision maker (both in the order OTH-LEA-OWN). In neither treatment we can reject the  $H_0$  that investment levels do not differ between payment conditions (OWN  $p = 0.981$ , LEA  $p = 0.561$ , OTH  $p = 0.924$ ). We also cannot reject the  $H_0$  that differences in investment levels between treatments do not differ between payment condition for either comparison ( $X^{\text{OWN}} - X^{\text{OTH}}$ ,  $p = 0.521$ ,  $X^{\text{OWN}} - X^{\text{LEA}}$   $p = 0.179$ ,  $X^{\text{OTH}} - X^{\text{LEA}}$ ,  $p = 0.488$ ). Hence, we pool the data, obtaining in total 175 observations. Find also the regressions below to confirm this decision.

Table A.4: Order Differences

	OTH-OWN-LEA (70)	LEA-OWN-OTH (70)	Difference (p-value)
$X^{\text{OWN}}$	4.68	4.37	-0.31 (0.474)
$X^{\text{LEA}}$	3.85	4.00	-0.15 (0.770)
$X^{\text{OTH}}$	3.90	3.84	-0.06 (0.375)
$S^{\text{OTH}}$	-0.77***	-0.53*	-0.24 (0.858)
$S^{\text{LEA}}$	-0.83***	-0.37*	-0.46 (0.348)

*Notes.* The table shows averages in investments in the three treatments OWN, LEA, and OTH separated by treatment order. The last two rows contain the shift between investments in OTH and OWN ( $S^{\text{OTH}} = X^{\text{OTH}} - X^{\text{OWN}}$ ) and between LEA and OWN ( $S^{\text{LEA}} = X^{\text{LEA}} - X^{\text{OWN}}$ ). The last column shows the p-values from a Mann-Whitney U test comparing the two previous columns. The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that differences equal zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ .

Table A.5: Payment differences

	$\pi_m = 0$ (70)	$\pi_m = 31.50$ (35)	Difference (p-value)
$X^{\text{OWN}}$	4.68	4.65	0.03 (0.981)
$X^{\text{LEA}}$	3.85	4.21	-0.36 (0.561)
$X^{\text{OTH}}$	3.90	4.03	-0.13 (0.924)
$S^{\text{OTH}}$	-0.77***	-0.63	-0.14 (0.521)
$S^{\text{LEA}}$	-0.83***	-0.45	-0.38 (0.179)

*Notes.* The table shows averages in investments in the three treatments OWN, LEA, and OTH separated by payment differences in OTH. The last two rows contain the shift between investments in OTH and OWN ( $S^{\text{OTH}} = X^{\text{OTH}} - X^{\text{OWN}}$ ) and between LEA and OWN ( $S^{\text{LEA}} = X^{\text{LEA}} - X^{\text{OWN}}$ ). The last column shows the p-values from a Mann-Whitney U test comparing the two previous columns. The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that differences equal zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ .

## B Gender Effects

Charness and Gneezy (2012) provide evidence for a gender effect in the Gneezy and Potters (1997) environment with varying payments and probabilities. To test whether a gender effect has an impact on investment levels, we compare 82 observations in which females made investment decisions to 93 observations in which males made investment decisions. Using a Mann-Whitney U test we evaluate the  $H_0$  that investment levels do not differ between gender. Although investment levels are on average higher for males than for females (male average minus female average: OWN 0.67, LEA 0.43, OTH 0.55), we can reject the  $H_0$  in neither treatment (OWN  $p = 0.210$ , LEA  $p = 0.525$ , OTH  $p = 0.178$ ). Next, we test the  $H_0$  that differences in investment levels between treatments do not differ between gender. Again, we cannot reject the  $H_0$  for all comparisons ( $X^{\text{OWN}} - X^{\text{OTH}}$ ,  $p = 0.972$ ,  $X^{\text{OWN}} - X^{\text{LEA}}$ ,  $p = 0.371$ ,  $X^{\text{OTH}} - X^{\text{LEA}}$ ,  $p = 0.541$ ). Hence, we find no significant gender effect.

Table B.6: Gender differences

	females (81)	male (93)	Difference (p-value)
$X^{OWN}$	4.20	4.87	-0.67 (0.210)
$X^{LEA}$	3.75	4.18	-0.44 (0.525)
$X^{OTH}$	3.61	4.16	-0.55 (0.178)
$S^{OTH}$	-0.44**	-0.69**	0.25 (0.972)
$S^{LEA}$	-0.59***	-0.70**	0.11 (0.371)

*Notes.* The table shows averages in investments in the three treatments OWN, LEA, and OTH separated by payment differences in OTH. The last two rows contain the shift between investments in OTH and OWN ( $S^{OTH} = X^{OTH} - X^{OWN}$ ) and between LEA and OWN ( $S^{LEA} = X^{LEA} - X^{OWN}$ ). The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that differences equal zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ . The p-values in brackets refer to a Mann Whitney U test comparing the unit of interest across treatments.

Why is there no significant gender effect? It is argued that the gender effect is rather due to loss aversion than due to risk aversion. Especially, in the Gneezy and Potters (1997) environment the reference point is unclear; it might be the endowment or zero. In our z-Tree screen design the reference point might be shifted toward zero. Subjects first generated a list of payoffs by entering investment levels and then chose one of these investment levels. In this screen we provide information on the payoff when successful and on the payoff when not successful; both above or at zero. Thus, we virtually reduce loss aversion as we provide information in the gain domain only and, thus, set the reference point to zero.

In a debriefing questionnaire, we ask several questions on risk aversion in line with Dohmen et al. (2011). Using a Mann-Whitney U test, we find significant gender differences in questions about risk taking in general ( $p = 0.004$ ), while driving a car ( $p = 0.019$ ), when making financial decisions ( $p = 0.002$ ), and to some extent in sports and leisure ( $p = 0.074$ ). We find no effect in questions on risk taking in career ( $p = 0.319$ ), health ( $p = 0.937$ ), trust in strangers ( $p = 0.567$ ), or in a hypothetical investment decision ( $p = 0.132$ ).

## C Robustness check with one client only

It has been argued that a decision for others decreases loss aversion resulting in a risky shift in OTH (Andersson et al., forthcoming). However, none of the relevant studies considers more than one client. In our study we increase the responsibility to six clients and thereby increase the total potential loss from 9 Euro in OWN to 54 Euro in OTH. The higher responsibility might increase the loss aversion due to a multiplicative effect and results in an overall cautious shift.



To test whether the magnitude of responsibility plays a role, we ran a follow up experiment under the same conditions but with a group size of two, i.e., one money manager decides for one client in LEA and OTH. As hypothesized we expect a risky shift, i.e., we test the  $H_0$  that  $S^{\text{LEA}} \leq 0$  and that  $S^{\text{OTH}} \leq 0$  using a one-sided Wilcoxon signed rank test. In a OTH-OWN-LEA sequence with 34 observations, we cannot reject  $H_0$  and, thus, find no evidence for a risky shift ( $S^{\text{LEA}} = -0.44$ ,  $p = 0.319$ ,  $S^{\text{OTH}} = -0.03$ ,  $p = 0.284$ ). In line with the analysis in the paper, we split the sample in low risk sample ( $n = 21$ ) and high risk sample ( $n = 13$ ) at  $X^{\text{OWN}} = 4$  and ran a two sided Wilcoxon signed rank test. As for the six clients treatments, we find an indication for a risky shift in the low risk sample ( $S_l^{\text{LEA}} = 0.10$ ,  $p = 0.404$ ,  $S_l^{\text{OTH}} = 0.76$ ,  $p = 0.095$ ) and we find a significant cautious shift in the high risk sample ( $S_h^{\text{LEA}} = -1.33$ ,  $p = 0.053$ ,  $S_h^{\text{OTH}} = -1.30$ ,  $p = 0.017$ ); again in both cases stronger in OTH than in LEA. Comparing investments and investment shifts by group size, 175 observations with six clients and 34 observations with one client, we find no significant difference in decisions for each measure considered ( $p > 0.314$ ).

Table C.7: Decisions for one client only

	all (34)	high risk (13)	low risk (21)
$X^{\text{OWN}}$	4.37 (1.97)	6.43 (1.43)	3.09 (0.83)
$X^{\text{LEA}}$	3.82 (2.20)	5.11 (2.60)	3.20 (1.56)
$X^{\text{OTH}}$	4.34 (2.01)	5.13 (1.80)	3.85 (2.01)
$S^{\text{OTH}}$	-0.44 (1.90)	-1.30** (1.65)	0.76* (1.79)
$S^{\text{LEA}}$	-0.03 (1.99)	-1.33* (2.48)	0.10 (1.21)
$S^{\text{OTH}} - S^{\text{LEA}}$	-0.41 (1.94)	-0.03 (1.51)	0.65 (2.17)

*Notes.* The second column contains all observations, high risk reports observations for subjects investing above the median (4) in OWN, low risk reports observations for subjects investing below or at the median in OWN. The last three rows contain the shift between investments in OTH and OWN ( $S^{\text{OTH}} = X^{\text{OTH}} - X^{\text{OWN}}$ ) and between LEA and OWN ( $S^{\text{LEA}} = X^{\text{LEA}} - X^{\text{OWN}}$ ). Standard deviations reported in parenthesis. The asterisks refer to the p-value from a Wilcoxon signed rank test testing the  $H_0$  that differences equal zero. \* =  $p < 0.1$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.001$ .

## D Regressions

In the OLS regressions in table D.8 and in table D.9, we regress the shift in investments,  $S^{\text{OTH}}$  and  $S^{\text{LEA}}$  respectively, on treatment conditions (Dummy variables *Order*, *High payment* in OTH, and *One client*), subjects characteristics (*Female*, *Age*, and *Econ student*), and elicited measures (Being in a high risk sample: *High risk*, and *SR-score*, the social responsibility score, taken from Berkowitz and Lutterman (1968)). Model (1) shows that even if we control for

treatment conditions we find the constant to be significantly negative, which is in line with non-parametric considerations in section C and section A. In model (2) and model (3) we see, however, that the relatively risk seeking subjects drive the cautious shift as the *High risk* coefficient is negative and highly significant. In line with section B we find no gender effect. Finally, we elicited the SR-score to show that social responsible subjects act rather in line with responsibility alleviation. However, we find no correlation with the dependent variables and we also find no indication that subjects who score high on the SR-score act more in line with what they think the clients would do for themselves.

Table D.8: OLS with  $S^{\text{OTH}}$  as dependent variable

	(1)	(2)	(3)
Order	0.2389 (0.3949)	0.0689 (0.3594)	0.0750 (0.3612)
High payment	0.1427 (0.4837)	0.1144 (0.4391)	0.0474 (0.4423)
One client	0.7404 (0.4884)	0.5072 (0.4447)	0.6572 (0.4581)
High risk		-1.9825*** (0.2962)	-2.0375*** (0.3002)
Female			0.1259 (0.3026)
Age			0.0815** (0.0378)
Econ student			0.1662 (0.3053)
SR-score			-0.1405 (0.2224)
Constant	-0.7713*** (0.2793)	0.2199 (0.2936)	-1.1039 (1.5410)
Observations	209	209	208
R-squared	0.011	0.189	0.208

*Notes:* The table shows OLS regressions. The independent dummy variables are *Order*, being 1 when LEA is played first, *High Payment*, being 1 when the money manager receives a payment of 31.50 Euro instead of a zero payment, *One client*, being 1 when the money manager invested for only one client, *High risk*, being 1 when investments in OWN are higher than the median investment in OWN (= 4.00 Euro), *Female*, being 1 if the participant was a woman, and *Econ student*, being 1 if the student was an economics student. Further variables are *Age*, *General risk* (a higher score indicates a higher propensity to take risks), and *SR-score* (Social Responsibility Score), taken from Berkowitz and Lutterman (1968) (a higher score indicates higher social responsibility). Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table D.9: OLS with  $S^{\text{LEA}}$  as dependent variable

	(1)	(2)	(3)
Order	0.4550 (0.2770)	0.3408 (0.2544)	0.3499 (0.2578)
High payment	0.3857 (0.3393)	0.3667 (0.3108)	0.3367 (0.3157)
One client	0.3873 (0.3426)	0.2306 (0.3148)	0.2539 (0.3270)
High risk		-1.3321*** (0.2097)	-1.3469*** (0.2142)
Female			0.1731 (0.2160)
Age			0.0158 (0.0270)
Econ students			0.0543 (0.2179)
SR-score			-0.1482 (0.1588)
Constant	-0.8314*** (0.1959)	-0.1654 (0.2078)	0.1614 (1.0999)
Observations	209	209	208
R-squared	0.015	0.178	0.184

*Notes:* The table shows OLS regressions. The independent dummy variables are *Order*, being 1 when LEA is played first, *High Payment*, being 1 when the money manager receives a payment of 31.50 Euro instead of a zero payment, *One client*, being 1 when the money manager invested for only one client, *High risk*, being 1 when investments in OWN are higher than the median investment in OWN (= 4.00 Euro), *Female*, being 1 if the participant was a woman, and *Econ student*, being 1 if the student was an economics student. Further variables are *Age*, and SR-score (Social Responsibility Score), taken from Berkowitz and Lutterman (1968) (a higher score indicates higher social responsibility). Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## E Decision Screen

Figure 1 provides a screenshot of an investment decision in OWN. Subjects were able to enter arbitrary investment levels in the gray field (“INPUT in Euro”). A click on the gray button (“GENERATE PAYOFFS”) added a new line to a table. The table listed the investment in the first column, the payoff in case of a loss along with the probability in the second column, and the

payoff in case of a win along with the probability in the last column. The ultimate investment was chosen by marking one line in the list and by clicking the red button (“CONFIRM YOUR ULTIMATE INVESTMENT”). Then a pop-up asked whether the decision is ultimate or whether the subject wants to revise it. The decisions in LEA and OTH additionally displayed the payoff for the clients. The z-Tree code is available upon request.

Figure 1: How to make the investment decision

EINSATZ in Euro		AUSZÄHLUNGEN GENERIEREN	
Einsatz	Ihre Auszahlung bei MISERFOLG (Würfelwurf 1, 2, 3 oder 4)	Ihre Auszahlung bei ERFOLG (Würfelwurf 5 oder 6)	
3.50	5.50	17.75	
7.20	1.80	27.00	
1.00	8.00	11.50	
9.00	0.00	31.50	
5.70	3.30	23.25	
3.80	5.20	18.50	
2.50	6.50	15.25	

**BESTÄTIGEN SIE ENTGÜLTIG DEN EINSATZ**

## F Instructions

Find below the translated instructions for setup one, OTH-OWN-LEA. The instructions were split into three subsets (labelled F.1 to F.3 here). The instructions for F.1 were distributed at the beginning of the experiment, the other parts were distributed only when the preceding part was concluded. The German instructions are available upon request.

### F.1 Treatment OTH

#### INSTRUCTIONS

Welcome to the experiment. Please do not talk to any other participant from now on. We kindly ask you to use only those functions of the PC that are necessary for the conduct of the experiment. The purpose of this experiment is to study decision behavior. You can earn real money in this experiment. Your payment will be determined solely by your own decisions according to the rules on the following pages. The data from the experiment will be anonymized and cannot be related to the identities of the participants.

Neither the other participants nor the experimenter will find out which choices you have made and how much you have earned during the experiment.

## SUB EXPERIMENTS

You will participate in three independent sub experiments followed by a short questionnaire. For each sub experiment you receive a new set of instructions. Of the three sub experiments only one will be paid out at the end of the experiment. The payoff relevant experiment will be randomly determined by the roll of a die.

### EXPERIMENT 1

**Groups** - At the begin of the experiments you will be randomly organized in groups of seven participants. Your group affiliation has no impact on your tasks or your payment.

**Role** - In this part participants are either *active* or *passive* members. In each group there is only one active member. This member decides for all other six members and, thereby, determines their payoff. The active group member will randomly be determined at the end of the experiment. *First, all participants decide as the active member for all other group members.* At the end of the experiment the real active member will be determined and his decision will be implemented.

**Task** - In the following your decision as an active member will be explained. The passive members receive 9 Euro each. You now decide for each of the other members how much of their 9 Euro to invest in a risky project. *The investment is the same for each passive group member, i.e., when you invest a certain amount then you invest this amount for each passive group member.* The remaining amount (9 Euro - Investment) will be paid out to each passive member independent of the project's success.

The project is either a success or a failure. In case of a success each passive member gets her invested amount back and in addition receives 2.5 times of the investment as a gain:

*Payment in case of success =  $9 + 2.5 \times \text{Investment}$ .*

In case of a failure the investment is lost:

*Payment in case of failure =  $9 - \text{Investment}$ .*

Whether the project is successful will be determined by the throw of a six-sided die at the end of the experiment. In case of a five or six, the project is a success, in case of a one, two, three or four the project is a failure. The probability of success is therefore 33.33%.

The active member receives *no payoff* in this sub experiment..

**Procedure** - Details on how to enter the investments - calculation of potential payments, fields of entry, etc - will be displayed on the upper part of your screen once the experiment has started.

## F.2 Treatment OWN

### EXPERIMENT 2

In this experiment you decide only for yourself, *independent of the other participants*. You receive 9 Euro and decide how much of their 9 Euro to invest in a risky project. The remaining amount (9 Euro - Investment) will be paid out independent of the project's success.

The project is either a success or a failure. In case of a success You will get your invested amount back and in addition receive 2.5 times of the investment as a gain:

*Payment in case of success =  $9 + 2.5 \times \text{Investment}$ .*

In case of a failure the investment is lost:

*Payment in case of failure =  $9 - \text{Investment}$ .*

Whether the project is successful will be determined by the throw of a six-sided die at the end of the experiment. In case of a five or six, the project is a success, in case of a one, two, three or four the project is a failure. The probability of success is therefore 33.33%.

**Procedure** - Details on how to enter the investments - calculation of potential payments, fields of entry, etc - will be displayed on the upper part of your screen once the experiment has started.

## F.3 Treatment LEA

### EXPERIMENT 3

**Groups** - At the begin of the experiments you will be randomly organized in groups of seven participants. You will be regrouped, this means that the group members are not the same as in the first sub experiment. Your group affiliation has no impact on your tasks or your payment.

**Role** - In this part participants are either *active* or *passive* members. In each group there is only one active member. This member decides for all other six members and, there by, determines their payoff. The active group member will randomly be determined at the end of the experiment. *First, all participants decide as the active member for all other group members.* At the end of the experiment the real active member will be determined and his decision will be implemented.

**Task** - In the following your decision as an active member will be explained. Each group member (active and passive) members receives 9 Euro each. You now decide for each member of the group, including yourself, how much of the 9 Euro to invest in a risky project. *The investment is the same for each passive group member, i.e., when you invest a certain amount then you invest this amount for yourself and for each passive group member.* The remaining amount (9 Euro - Investment) will be paid out to group member independent of the project's success.

The project is either a success or a failure. In case of a success each group member gets her invested amount back and in addition receives 2.5 times of the investment as a gain:

*Payment in case of success =  $9 + 2.5 \times \text{Investment}$ .*

In case of a failure the investment is lost:

*Payment in case of failure =  $9 - \text{Investment}$ .*

Whether the project is successful will be determined by the throw of a six-sided die at the end of the experiment. In case of a five or six, the project is a success, in case of a one, two, three or four the project is a failure. The probability of success is therefore 33.33%.

The active member receives *no payoff* in this sub experiment..

**Procedure** - Details on how to enter the investments - calculation of potential payments, fields of entry, etc - will be displayed on the upper part of your screen once the experiment has started.

#### END OF EXPERIMENT

At first we will determine, by the roll of a die, which experiment will determine your payoff. Thereafter, a separate dice roll for each group will determine whether the project was successful or not. After you answered a short questionnaire your payment will be shown at your screen. Please enter the amount on your receipt. You will be called individually to the payoff desk. Please bring the small number plate and the signed receipt with you. The payment will be in cash, private and anonymous.



## G Literature Overview

Table G.10: Literature Review

Article	Game	Design	Support	Potential Confound Effects
OWN vs. OTH				
Reynolds et al. (2009)	BP	WS	CS	Accountability, Recency Effect <sup>a</sup>
Eriksen and Kralø (2010)	GP	BS	CS	
Chakravarty et al. (2011)	MPL/FPA	WS	RS/RS	Deception, Misaligned Incentives <sup>b</sup> High Social Distance Accountability, Order <sup>c</sup>
Polman (2012)	Invest in Coin Toss	WS	RS	
Andersson et al. (forthcoming)	MPL	BS	No significant effect	
Montinari and Raucan (2013)	GP	WS	RS (friends only)	
Pollmann et al. (2014)	GP	BS	RS	
OWN vs. LEA				
Charness and Jackson (2009)	Stag-Hunt Game	BS	Indication for CS	Implied Accountability, Recency Effect
Sutter (2009)	GP <sup>d</sup>	BS	RS	
Pahlke et al. (2012)	BP	BS	CS	Accountability High Social Distance
Humphrey and Renner (2011)	MPL	BS	No significant effect	
Andersson et al. (forthcoming)	MPL	BS	No significant effect	
Bolton et al. (2015)	MPL	WS	CS	

*Notes:* In the table, only results in the gain domain are considered. We consider significant levels of 5 percent. Abbreviations: BP = binary prospects, a choice between two lotteries (or one risky lottery and a guaranteed payment). MLP = multiple price list in line with Holt and Laury (2002), FPA = first price auction against the computer, GP = design similar to (Gneezy and Potters, 1997). WS/BS = within subject design/between subject design. The studies find support for either a *cautious shift* (CS), i.e., more risk in OWN than in OTH/LEA, or a *risky shift* (RS), i.e., less risk taking in OWN than in OTH/LEA.

<sup>a</sup>Results might be biased. First clients inferred the identity of the investment manager (accountability). Second, investment manager decided always first for himself, received feedback, and decided afterward for the others.

<sup>b</sup>See their implementation on page 119.

<sup>c</sup>In contrast to GP they apply a lottery with expected value below endowment. Each subject went through three times 12 decisions with order OWN, OTH (strangers), OTH (friends).

<sup>d</sup>In PAY-COMM one of three in a group decided for repetitions 1-3, the second for 4-6, and the third for 7-9.