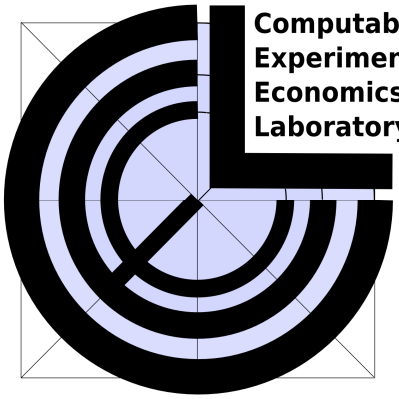

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Social Effects in a Multi-Agent Investment Game. An Experimental Analysis.

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Social Effects in a Multi-Agent Investment Game

An Experimental Analysis

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Abstract

We experimentally investigate social effects in a principal-agent setting with incomplete contracts. The strategic interaction scheme is based on the well-known Investment Game (Berg *et al.*, 1995). In our setting four agents (i.e., trustees) and one principal (i.e., trustor) are interacting and the access to choices of peers in the group of trustees is experimentally manipulated. Overall, subjects are positively influenced by peer's choices they observe. However, the positive interaction between choices is not strong enough to raise the reciprocity of those observing at the same level of those whose choices are observed.

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1 Introduction

In many contexts, the actions of some peers seem to influence the actions of others in the group. Social interactions of this kind may have different nature, but all produce a correlation in the behavior at the group level (Glaeser and Scheinkman, 2001). As an example, an household may join a recycling-oriented separate waste collection program just because many households in the neighborhood have joined it. The economic literature on decision making has traditionally disregarded spillovers at the action level to focus on transactions regulated by a market system. However, since the seminal work of Schelling (1973), theoretical and empirical contributions have highlighted the economic relevance of social interactions (for a review see, Soetevent, 2006). Despite the growing interest shown by the economic literature for social interactions, the identification of social effects in field-happenstance data remains quite problematic. Spillovers between the group and the individual are difficult to estimate because of endogenous sorting into a group and simultaneity of actions at the individual and at the group level (*i.e., reflection problem*, see Manski, 1993).

The present work focuses on the impact of social interactions on reciprocity-laden choices. To avoid well-known identification problems, some properties of the laboratory setting are exploited. In particular, randomized sorting and an accurate control of the information flows are implemented.

In a seminal contribution, Arrow (1974) highlighted the efficiency-enhancing role of trust in an economic system. Several other works stressed the relevance of trust for economic growth (among others see, La Porta *et al.*, 1997; Putnam, 1993). Broadly speaking, trust can be defined as the belief that others are not going to exploit a vulnerability that one has created by herself when taking a certain action (James, 2002). Thus, trust relies on the reciprocative attitude of the counterpart. The relevance of reciprocity in agency issues has been firstly recognized by Akerlof (1982) and since then has received a lot of attention by experimental economics. Fehr and Gächter (1998) revise some of these experimental contributions and draw evidence in support of reciprocity as a common trait of human beings. However, while experimental economics has paid a lot of attention to social preferences in strategic interactions (Camerer, 2003), few works explored the connections between social effects and choices having an impact on others' welfare.

The interaction setting under investigation is a modification of the Investment Game (Berg *et al.*, 1995). In our interaction setting a principal has to decide how much to "invest" in a project that delivers returns with certainty. However, the returns from the project are not attributed to the principal but are equally split among a cohort of agents. Each of the agents must independently

choose how much of the returns share with the principal. Like in the Investment Game, a positive amount sent by the principal and by the agents is taken as a signal of trust and reciprocity, respectively. This is because, in a standard goal-oriented framework, the conflicting interests of parties in the interaction and the absence of insurance on the investment should produce nil investments. In fact, selfish agents are expected to fully retain the returns on the investment and, consequently, rational principals are expected not to undertake the investment. However, previous contributions have shown that principals tend to trust, at least partly, their agents and the latter share some of the returns from the investment with the principals (for a review see, Camerer, 2003).

Main innovation of our design is that we allow for social effects among the agents. In a treatment condition the agents are coupled and the amount sent back to the principal by one in the couple is observed by a fellow agent. This represents the backbone of the two experiments presented below. Within this framework, particular attention is paid to the impact of peer pressure and to social spillovers on fully-incentivized choices.

Concerning the relevance of social pressure in experimental games, the work of Hoffman *et al.* (1994) was among the first to recognize the relevance of reputational concerns in laboratory strategic interactions. From evidence collected under alternative anonymity conditions in bargaining games the authors argue that "other-regarding preferences may have an overwhelming social, what-do-others-know, component and therefore should be *derived* formally from more elementary expectational considerations." [p. 371]. In our setting, while identity of interacting partners is never disclosed, it may be possible that observed agents perceived choices in the game as a way to signal their other-regarding concerns to other players. On this aspect, previous experimental works have shown that incentives in the form of social approval or prestige are likely to foster generosity, both in the field (Soetevent, 2001) and in the laboratory (Rege and Telle, 2004).

Concerning social spillovers in choices, some recent works focused on spillovers at the action level between leaders and followers in sequential contributions to public goods. Alternative approaches to the observed across-subjects correlation in this kind of choices can be identified in the literature. On the one hand, Potters *et al.* (2005) presents an interaction setting in which choices of the leaders have direct payoff-relevant consequences for the followers. As confirmed also by Potters *et al.* (2007), in a context of this kind behavioral spillovers have a predominant informational nature. On the other hand, Moxnes and van der Heijden (2003) and Güth *et al.* (2007) register spillovers at the action level also when choices of the leaders do not have a direct impact on payoffs of the followers. The authors interpret correlation in choices as due to reciprocity concerns

in the form of conditional cooperation. The relevance of conditional-cooperation is confirmed also by Bardsley and Sausgruber (2005) which, however, identify a concomitant pure conformity pressure in their data.

Two important differences between our experimental setting and Public Goods Games are to be mentioned. First, in our design payoff-relevant informational spillovers are not present. Second, in previous contributions the leader is interested in influencing choices of the follower because actions of the latter produce positive spillovers affecting also the payoff of the leader. In our setting this does not hold because actions of the followers do not directly affect the payoff of the leaders but the payoff of a third party (i.e., the principal). A contribution which is closer to ours is the recent work of Gächter *et al.* (2009) investigating the impact of social interaction on reciprocity. In particular, a Gift Exchange Game (e.g., Fehr *et al.*, 1998) is employed to understand whether relative wage and others' effort influence reciprocity considerations in the game. Gächter *et al.* find that relative wages do not impact on reciprocity, overall. However, for high wages, a positive interaction at the action level is observed among the agents.

In our experiment, subjects are positively influenced by peer's choices they observe. Social spillovers of this kind are stronger when all the agents cumulatively contribute to the wealth of the principal than when only one, randomly chosen from the group of agents, contributes. However, the positive interaction between choices is not strong enough to raise the reciprocity of those observing at the same level of those whose choices are observed. The concurrence to the definition of principal's wealth is of crucial relevance in shaping the behavior of those whose actions are observed. For high trust levels, the observed tend to return more than those in a baseline without social spillovers when all the agents contribute to the principal's well-being. In contrast, they return less than those in the baseline when only one agent contributes.

The present work contributes to the experimental literature on social preferences by providing evidence on the interplay between trust, reciprocity, and social interactions. In addition to this, evidence collected may provide some insights into behavior in organizations. The interaction structure under investigation captures a typical situation faced in principal-agent settings within organizations when only limited monitoring capacity and incomplete contracts are available. Furthermore, the presence of more than one agent in the interaction provides us with a more realistic interaction setting and facilitates the projection of experimental findings on real-world organizations.

The remainder of the paper is organized as follows. Section 2 illustrates the experimental design with details on the interaction structure, the treatments and the procedures followed in the experiment; Section 3 presents the results of

the quantitative analysis of experimental data; Section 4 discusses the results and concludes.

2 Method

In the following, two distinct experiments are presented. The two experiments share many design features and aim at addressing the same research concerns. However, they differ with regard to some procedural aspects. To ease the reading, the presentation of the interaction structure (Section 2.1) and of the experimental results (Section 3) are kept separate. Henceforth, the experiments are identified as Experiment I (*Exp.I*) and Experiment II (*Exp.II*).

2.1 Interaction Structure

The interaction structure under investigation is a modified version of the well-known Investment Game introduced by Berg *et al.* (1995). The main deviation from the original design is represented by the number of interacting subjects. Unlike the original design, in our setting one trustor, henceforth called principal, interacts with four trustees, henceforth called agents. Allocation to a role and to a group is randomly determined before the starting of the experiment and participants are made aware of this. The participants, independently of their role in the interaction, are not made aware of the identity of the other participants in the experiment.

2.1.1 Experiment I

The principal and the agents receive an endowment (E) of 10 ECU (= €5). The principal is asked to choose an amount $i \in I = \{0, 4, 6, 10\}$ that will be subtracted from her endowment and sent to the matched agents. This transfer can be thought as a risky investment without any assurance and, thus, provides us with a measure of trust on the side of the principal. The amount i is exogenously multiplied by a factor $\alpha = 4$ and the resultant $\alpha \times i$ is then equally split among the 4 agents. Choices of the agents are collected via a strategy method. In more details, each agent has to choose the amount r that she will return for each $i \in \{I|i > 0\}$ before knowing the actual i chosen by the principal. The amount returned, measuring the reciprocity of the agent, has to be reported as an integer number in the range going from zero to the amount received.

After having collected the choices of the agents, the actual choice of the principal becomes effective and payoffs of the parties in the interaction are computed. To elaborate, the payoff of an agent j belonging to the set of matched agents J is given by $\pi_j = E + \frac{\alpha}{4} \times i - r_j|i$, where $r_j|i$ is the amount returned

by agent j in correspondence to investment $i \in I$. Conversely, the payoff of the principal is given by $\pi_P = E - i + \sum_{j \in J} r_j | i$, where $\sum_{j \in J} r_j | i$ is the total amount returned by the agents in the set of matched agents J for the investment i.

After having reported their choices in the game, players are asked to report their beliefs about transfers in the game. In more details, principals are asked about the total amount they expect to receive from the agents for each investment level; agents are asked about the total amount the principal expects to receive, for each investment level. Both for the agents and for the principals, when the reported belief corresponds to the actual amount returned by the four agents in a group, 2 ECU are earned. Otherwise, nothing is earned out of the belief stage. Before confirming their choice the participants are remembered about this incentive structure by a pop-up message appearing on the screen where beliefs are entered.[1]

2.1.2 Experiment II

The main differences between *Exp.II* and *Exp.I* are in the procedure adopted to elicit beliefs and in the way payoffs in the game are computed. Two experimental phases are announced to the participants at the beginning of the experiment, but the nature of the second phase is not disclosed until the first phase is over. However, the participants are assured that earnings of the first phase are not affected by the second phase. In the first experimental phase the participants take part in the modified Investment Game. Similarly to *Exp.I*, the principal and the agents receive an endowment (E) of 10 ECU (= €5). The principal is asked to choose an amount $i \in I = \{0, 4, 6, 10\}$ that will be subtracted from her endowment and sent to the matched agents. Differently than *Exp.I*, the amount sent is multiplied by a factor $\alpha = 3$ and the resultant assigned to one of the agents randomly drawn. However, both the actual amount sent by the principal and the agent who has been randomly chosen are known to the agents only after all choices are made. This implies that all agents commit themselves to a given return (r) for each of the three positive investment levels, with likelihood 1/4 of being chosen. The payoff of the agent randomly chosen is equal to $E + 3i - \tilde{r}|i$ and the payoff of the principal is equal to $E - i + \tilde{r}|i$, where $\tilde{r}|i$ is the choice of the chosen agent for the investment i. Finally, the payoff of the agents not chosen is equal to E.

After choices in the game are collected, instructions for the beliefs elicitation phase are distributed. Agents are asked about an estimation of the choices

[1] While asking for principal's beliefs about the amount returned by the group, we adopted an incentive structure rewarding the correct inference about the actual amount returned by the agents. The implicit assumption behind this procedure is that the agents do not maintain that their expectations and those of the principal systematically differ. However, to avoid potential confusion a more straightforward formulation is employed in *Exp.II*.

of others in their same condition, while principals are asked about choices of agents in the experiment. Beliefs are incentivized via a quadratic scoring rule (for a review of beliefs elicitation methods, see Palfrey and Wang, 2007). In more details, the support of choices is divided into equally-spaced intervals and earnings (in UMS) are equal to $8 - \frac{4}{10000} \times \left[\sum_{k \in K}(I_k - p_k)^2\right]$, where K is the set of choice intervals, p_k is the probability assigned to interval k, and I_k is equal to 100 when the average estimated value falls in the interval k and equal to 0 otherwise. The maximum earnings in this phase (= 8 ECU) are obtained when full probability is assigned to the interval comprising the actual realization of the value subject of the estimation. The minimum earnings (= 0 ECU) are obtained when full probability is assigned to an interval not comprising the actual value.

2.2 Treatments

Both in *Exp.I* and in *Exp.II*, observations are collected under two main experimental conditions. In the *Baseline* treatment (B), the choices of the 4 agents in a group are collected simultaneously and agents are only informed about the total amount returned by agents in the group.

In the *PeerView* treatment (PV), half of the agents in a group are randomly assigned to the role of *Observer* and the other half is assigned to the role of *Observed*. Each *Observed* is exclusively matched with an *Observer*. The latter is made aware of the return choice of the former before reporting her binding return choice. It is important to stress that only anonymous choices will be displayed to those in the *Observer* condition and no treatment aimed at reducing social distance among the participants is implemented (Bohnet and Frey, 1999). Thus, the *PeerView* treatment allows for spillovers at the action level between those in the *Observed* and the *Observer* conditions and, at the same time, controls for potential reputational effects.

As a robustness check, two different versions of the *PeerView* treatment are implemented in *Exp.I*. In *PeerView1* ($PV1$) the *Observed* and the *Observer* choose simultaneously but the latter are told that their choice could be revised at no cost after having observed the choice of the *Observed*. After the *Observer* and the *Observed* have chosen, the *Observer* is informed about the choice of the matched *Observed* and remembered about her own choice. At this stage the *Observer* is asked again about the binding amount she wants to return to the principal. In *PeerView2* ($PV2$) the *Observer* chooses only after having observed the choice of the matched *Observed*. Aim of the two *PeerView* conditions is to control for potential resistance in the reception of the signal sent by the *Observed* due to the expression of a previous, cheap-talk, choice by the *Observer*. Concerning beliefs, in the *PeerView1* condition, the *Observer* reports them

both before and after having observed choices of the *Observed*. The *Observer* is informed that one of the two belief reports will be randomly chosen for payment.

2.3 Participants and Procedures

The computerized experiments were conducted at the Computable and Experimental Economics Laboratory (CEEL) of the University of Trento, Italy. [2] *Exp.I* was programmed using a purposely designed software and *Exp.II* was programmed using the Z-tree software (Fischbacher, 2007). A total of 275 undergraduate students of the University of Trento took part in only one session of the two experiments. In more details, 160 and 115 individual observations are available for *Exp.I* and *Exp.II*, respectively. Each session took about 40 minutes. A show-up fee of €2.50 was paid to each participant in *Exp.I*, while no show-up was paid to the participants in *Exp.II*.[3]

The roles in the experiment and the matching with other participants was defined by randomly assigning a cubicle to participants upon their arrival in the laboratory. Cubicles inhibited visual interaction among participants and communication during the experiment was strictly forbidden. The same instructions were distributed to each participant and participants were asked to read the instructions privately. Then, instructions were read aloud by the experimenter and subjects were let free to ask questions privately. The instructions were written in a neutral form, with the players in the game labelled as A (principal) and B (agent).

The experiment started only after each participant had answered correctly to a control questionnaire. Participants became aware of their role only after having answered the questionnaire. At the end of the one-shot interaction, pieces of payoff-relevant information were displayed on the screen together with the earnings in the experiment. Lastly, participants were asked to leave the room and earnings were dispensed in cash.

2.4 Research Hypotheses

The present work focuses on the behavior of agents in a modified Investment Game (Berg *et al.*, 1995). Similarly to what happens in the original version of the game, the standard subgame-perfect outcome prediction is $r_j = 0$ and $i = 0$, $\forall j \in J$. In fact, a maximizing self-oriented agent will always return nothing for each possible investment level and, accordingly, a self-oriented maximizing agent

[2]The personnel at CEEL is acknowledge for assistance in conducting the experiment. In particular, Marco Tecilla and Claudio Stolf are acknowledge for designing the software and managing the recruiting phase, respectively.

[3]As illustrated in Section 2.1.2, for the agents in *Exp.II* a show-up fee of €3.75, in expected terms, is embedded in the procedure adopted.

will optimally react to this by not investing. It is important to notice here that under standard assumptions of selfishness the choices of "peer" agents do not affect the equilibrium considerations of each single agent. Thus, the introduction of a multiplicity of trustees in the interaction does not affect the equilibrium properties of the game.

Two distinct behavioral hypotheses will be tested against data collected in the laboratory. The hypotheses refer to the *Observed* and to the *Observer*, respectively. The first hypothesis that will be tested is whether the amount returned by the *Observed* in the *PeerView* condition (r^{PV}_{obsd}) is overall higher than the amount returned by agents in the *Baseline* condition (r^{B})

Hypothesis 1 $E[r^{PV}_{obsd}] > E[r^{B}]$.

The non-rejection of Hypothesis 1 will be interpreted as a signal of the influence of peer pressure in the decision of the *Observed*. In fact, the first-movers in our setting have no incentive to strategically alter the amount returned to the principal. Thus, we hypothesize that higher returns by the *Observed* are to be ascribed to a psychological reward springing from the interaction between a non-selfish choice and the awareness of being observed by peers.

The other hypothesis that is going to be tested refers to the interaction between choices of those in the *Observed* and in the *Observer* conditions. In particular, it will be tested whether in the *PeerView* condition choices of the *Observer* (r^{PV}_{obsr}) are affected by choices of the *Observed* (r^{PV}_{obsd})

Hypothesis 2 $cov(r^{PV}_{obsd}, r^{PV}_{obsr}) \neq 0$.

The non-rejection of Hypothesis 2 will lead to alternative interpretations of the nature of social interactions in the experiment, according to the sign of the covariance. A tendency to conform to observed choices will result in a positive interaction between choices. This may originate either in pure preferences for conformity among the participants or in a combination of learning about social norms in the population and a desire to comply with these social norms. A negative covariance will signal a tendency to run counter to the choice of peers. At an aggregate level, sustained trustworthiness on the side of those in the *Observed* condition will result in a crowding-out of the trustworthiness of those in the *Observer* condition.

3 Results

The results of the two experiments are separately presented. The presentation has the following structure: first, outcomes of the experiment are generally assessed with the help of some descriptive statistics and are commented with the

support of statistical non-parametric tests; then, a count-data regression analysis is presented to gain in the understanding of the determinants of behavior in the interaction setting under investigation.

3.1 Descriptive Statistics

3.1.1 Experiment I

Agents

Some descriptive statistics about choices of the agents in different experimental conditions are reported in Table 1. Henceforth, the following labels are employed: *Baseline* (N=32) identifies choices of agents in the baseline condition, *PeerView1 Observed* (N=32) identifies choices of observed agents in the *PeerView1* condition, *PeerView2 Observed* (N=16) identifies choices of observed agents in the *PeerView2* condition, *PeerView1 Observer CT* (N=32) identifies first—cheap talk—choices of observer agents in the *PeerView1* condition, *PeerView1 Observer* (N=32) identifies second—incentivized—choices of observer agents in the *PeerView1* condition, and *PeerView2 Observer* (N=16) identifies choices of observer agents in the *PeerView2* condition.

[Table 1 about here]

A series of non-parametric tests is employed to assess the statistical relevance of the differences observed in correspondence to alternative experimental specifications.[4] The pairwise comparisons of choices in *PeerView1 Observer CT* and *PeerView1 Observer* do not identify any significant difference between the two conditions, for all the positive investment levels (WSRT, all p-values > 0.05). Concerning differences between agents' choices in the *PeerView1* and *PeerView2* conditions, no significant differences are observed, both for those in *Observer* and for those in *Observed* (WRT, all p-values > 0.05). Given this, data from the two conditions are pooled in the remaining part of the descriptive analysis.

The barplots in Figure 1 provide us with a graphical representation of the distribution of agents' choices for each investment level and each experimental condition. The light-grey vertical bar identifies the average value of the corresponding distribution.

[Figure 1 about here]

[4]The following abbreviations are employed: Wilcoxon Signed Rank Test (WSRT); Wilcoxon Rank Sum Test (WRT); Fisher's Exact Test (FET). If not specified, the reported tests are two-sided.

From Figure 1 it can be inferred that zero-return is the mode of the distribution both in the *Baseline* and in the *Observer* condition. In contrast, in the *Observed* condition values are spread over positive values, up to the amount sent by the principal, and this reflects also in the average amount returned which is overall higher in this condition than in the other two.

A set of non-parametric tests highlights four main behavioral patterns in the agents' data. First, choices in the *Observed* condition are overall higher than choices of the agents in the *Baseline*, for each investment level (WRT, all p-values ≤ 0.023). Second, choices in the *Observer* condition do not statistically differ from choices in the *Baseline* (WRT, all p-values ≥ 0.867). Third, those in the *Observed* condition return more to the principal than those in the *Observer* condition, for each investment level (WSRT, all p-values ≤ 0.03). Fourth, a positive correlation between choices in the *Observed* and *Observer* conditions is registered. According to a Spearman's rank correlation ρ, the correlation appears to be stronger for higher investment levels: ρ=0.132 (p-value=0.3726), ρ=0.250 (p-value=0.086), and ρ=0.304 (p-value=0.035), for ascending investment levels.

Principals

A series of pairwise comparisons between choices of the principals in the Baseline, *PeerView1*, and *PeerView2* conditions does not identify any statistically significant differences (WRT, all p-values ≥ 0.586). The absence of differences across conditions is confirmed also by a FET on the contingency table of choices in the three conditions (p-value=0.936). To ease the reading of the data, observations in the *PeerView1* and *PeerView2* are pooled together. Figure 2 summarizes the empirical cumulative distribution function of choices of the principals in the Baseline and in the *PeerView* conditions.

[Figure 2 about here]

Median values of the distributions are equal to 4 in both experimental conditions. This signals moderate distrust by the side of the principals. Economic reasoning predicts the allocation of resources to the asset warranting the higher expected rate of return, when controlling for risk. The employment of a strategy method for choices of the agents allows us to conduct a descriptive analysis of the "optimality" of principal choices. The average rates of return of the investment are given by the amount returned by the agents: for an investment equal to 4 ECU the average return is equal to 3.125% in the *Baseline* and to 35.417% in the *PeerView*; for an investment equal to 6 ECU the average return is equal to 22.917% and 48.611% in the *Baseline* and in the *PeerView*, respectively; for

an investment equal to 10 ECU the average return is equal to 25.500% and 45.417% in the *Baseline* and in the *PeerView*, respectively. [5]

3.1.2 Experiment II

Agents

Figure 3 shows the distribution of agents' choices for the three investment levels.

[Figure 3 about here]

Concerning the *Observer* condition, about one third of the choices are registered in correspondence to the zero-return option. In the *Baseline* and *Observed* conditions choices are more evenly distributed over the support of choices. The average return is below the positive return rate threshold, in each condition and for each investment level. The average amount returned by the agents is quite similar in the *Baseline* and in the *Observed* condition, but is considerably lower in the *Observer* condition.

A series of non-parametric tests shows that there are no major differences in choices across experimental conditions. Indeed, no significant differences are observed when comparing agents in the *Observed* condition and in the *Baseline* (WRT, all p-values ≥ 0.707), agents in the *Observer* condition and in the baseline (WRT, all p-values ≥ 0.206), and agents in the *Observer* and *Observed* conditions (WSRT, all p-values ≥ 0.137). While no notable difference are recorded in the central tendencies of the distributions, more zero-return choices are registered in the *Observer* condition than in the *Observed* condition, for the maximum investment level (FET, p-value=0.057). Finally, a positive correlation between choices in the *Observed* and in the *Observer* condition is registered for all the investment levels. However, the Spearman's rank correlation rho is statistically significant only for the highest investment level: ρ=0.142 (p-value=0.454), ρ=0.268 (p-value = 0.151), and ρ=0.392 (p-value=0.032), for ascending investment levels

In the *Exp.II* the expression of beliefs about the average contribution of agents in the same condition of the decision maker was incentivized via a quadratic scoring rule. To assess whether beliefs differed across distinct experimental conditions, the average belief for each participant was computed as the sum of the product between the median value of each beliefs interval and the probability associated to that interval.

As Table 2 shows, the median of the agents' average beliefs is always slightly higher than the amount invested by the principal. Moreover, the values are quite

[5] It is interesting to notice that in the baseline treatment of Berg *et al.* (1995) an average negative rate of return is registered (i.e., -9.69%), with average investment equal to \$5.16 and average repayment equal to \$4.66.

similar across all experimental conditions. To test the existence of differences across experimental condition, a Kruskal-Wallis Rank Sum test was performed on the individual-level averages (across the investment levels) in the three experimental conditions. The test does not reject the null hypothesis that the location parameter of the three beliefs distributions is the same (p-value=0.675).

The joint analysis of choices in the game and beliefs about others in the same role can help us better understand the behavior of the agents. To compare these two dimensions, both choices and beliefs are taken as individual-level averages across the three investment levels. In all three experimental conditions (i.e., *Baseline*, *Observed*, and *Observer*) average beliefs are significantly higher than actual choices (WSRT, all p-values ≤ 0.030). In addition, a positive correlation between beliefs and choices is observed in all three conditions: in the *Baseline* the Spearman's rank correlation rho is equal to 0.401 (p-value=0.023), in the *Observed* condition it is equal to 0.578 (p-value=0.001), and in the *Observer* condition it is equal to 0.646 (p-value=< 0.001).

Principals

The median investment level is equal to 4 both in the baseline and in the *PeerView* condition. As shown also by Figure 4, the average investment is slightly higher in the former (4 ECU) than in the latter (2.8 ECU). However, no statistically significant difference is registered by a WRT (p-value=0.409) and by a FET (p-value=0.784).

[Figure 4 about here]

Beliefs of the principals are to be read as subjective expectations about the amount returned by the agents. In the Baseline, average expectations are always bigger than the amount invested (see Table 2). A similar pattern is observed also in the *PeerView* condition. A comparison of the individual-level averages in the *Baseline* and in the *PeerView* does not show any statistically significant difference between the two conditions (WRT, p-value = 0.681). Thus, principals do not anticipate any extra-return from the social interactions characterizing the *PeerView* condition. The juxtaposition of average beliefs (see Table 2) and of average agents' choices (see 3) highlights the overall optimism of the principals when evaluating agents' other-regarding attitudes. From this it can be inferred that the overall low level of the investments undertaken is not justified by scarce profit expectations but by the uncertainty of these expectations or, in other terms, by the perceived risk of the investment.

An ex-post evaluation of the investment opportunities shows that the average rate of return is negative for each investment level and for both experimental

conditions. In the baseline condition it is equal to -20.312%, -22.396%, and -18.125% for an investment of 4, 6, and 10, respectively. In the *PeerView* condition it is equal to -28.750%, -28.889%, and -37.333% for an investment of 4, 6, and 10, respectively. Thus, undertaking an investment in *Exp.II* would have produced, on average, serious capital losses for the principals. Thus, in an ex-post assessment, the 53.33% of the principals in the *PeerView* and the 75% of the principals in the Baseline that undertake a positive investment seem to be overly optimistic about the kindness of the counterpart.

3.2 Regression Analysis

The regression analysis reported here focuses on determinants of agents' choices. The analysis conducted is twofold. On the one hand, choices in the *Observed* and in the *Observer* conditions are, separately, assessed against choices in the *Baseline* (see, Table 3 and Table 5). On the other hand the impact of the observed choices on the amount sent by those *Observer* condition is estimated (see, Table 4 and Table 6).

Choices of the agents in the game were restricted to integer values. To account for this restriction imposed on the data generating process, some regression models for count data were adopted in the estimation (for a review of this class of models see, Cameron and Trivedi, 1998). The following empirical identification strategy has been adopted. First, a likelihood ratio test was performed to test the null hypothesis that in a Poisson model the conditional variance and mean were equal. If the null was not rejected, a Poisson (P) model was estimated. If the null was rejected, a check about the nature of the over-dispersion was performed. A potential source of overdispersion may be represented by an high number of zeroes in the distribution. Consequently, the same over-dispersion test was performed for a model fitting only strictly positive outcomes for the dependent variable. If the null hypothesis of no-overdispersion was not rejected a Hurdle Poisson (HP) model was estimated. Otherwise, a Hurdle Negative Binomial (HNB) model was estimated. The adoption of the hurdle model has an intuitive interpretation in terms of the decision process governing agents' choices: the agent first decides whether to reciprocate or not and then decides how much to reciprocate. Thus, the *hurdle* component of the model (the upper panel in the regression tables) aims at capturing rational selfish evaluations and the *count* component (the lower panel in the regression tables) aims at capturing the strength of reciprocity considerations.

The interaction structure under investigation implies that alternative levels of trust by the principal impose alternative supports for the distribution of agents' choices. To better appreciate different reactions to different levels

of trust and to avoid complications in the parameter estimation due to heteroscedasticity in the data, the three investment levels are kept separate.

The dependent variable in the regressions of Table 3 and Table 5 is given by the amount sent by the agent (*Amount Sent*). As regards explanatory variables, the following measures are considered. The variable *Observed* is equal to 1 when the agent's choice is observed by another agent; it is equal to 0 for observations in the *Baseline*. On the contrary, the variable *Observer* is equal to 1 when the agent can observe the choice of another agent; it is equal to 0 for observations in the *Baseline*. The variable *Female* is equal to 1 when the agent is a female and equal to 0 when male. *Age* registers the age of the agent in years. The variable *Beliefs* registers the beliefs of the agent about the total amount returned by the other agents in the session.

The dependent variable in the regressions of Table 4 and Table 6 is given by the amount sent by the agent (*Amount Sent*). In addition to the set of explanatory variables in Table 3, a new dimension is introduced here. *Amount.observed* measures the amount sent by the matched observed agent.

3.2.1 Experiment I

Table 3 reports a regression estimation which compares choices in the *Observed*/*Observer* conditions and choices of the agents in the *Baseline*.[6]

[Table 3 about here]

The upper panel in Table 3 (count component) shows that those in *Observed* tend to reciprocate more than the agents in the *Baseline*, while the opposite holds for those in *Observer*. However, the effect is statistically significant only for the former in the high trust condition. Beliefs about others' contributions positively impact on the amount sent back, both for those in the *Observer* and in the *Observed*, for each trust level. The control variables age and gender do not significantly impact on reciprocity choices, overall. Given the absence of overdispersion in choices of those in *Observed* condition, the hurdle component of Table 3 refers only to the *Observer* condition. Overall, the beliefs about the amount returned in the game have a positive impact on the probability of choosing a positive return. Females are more likely to choose a positive return but the effect is statistically significant only for moderate trust levels.

In Table 4, choices of those in *Observer* condition are regressed against the amount observed, beliefs about others and two idiosyncratic control variables.

[Table 4 about here]

[6] Condition *Obsr.PV1.ct* has been omitted from the sample because, differently than the other choices in the sample, choices in this condition are not collected under an incentive compatible scheme.

For strictly positive returns and any trust level, the amount sent by the matched *Observed* positively impacts on the amount returned to the principal. However, the magnitude of the impact is quite moderate and this helps explain why, as highlighted by the descriptive statistics, those in *Observer* tend to return less to the matched principal than those in *Observed*. The hurdle component does not highlight any relevant social effect in the propensity of returning a positive amount. In correspondence to the moderate trust level a gender effect is detected.

3.2.2 Experiment II

Table 5 reports a regression analysis of agents' choices in distinct experimental conditions of *Exp.II*.

[Table 5 about here]

The count component in Table 5 shows that those in *Observer* and those in *Observed* do not systematically differ from agents in the *Baseline*. The only exception is observed for those in *Observed* in correspondence to the high trust level. In this condition the *Observed* tend to return less than those in the baseline condition. Beliefs about others' actions positively affect the amount returned, both for those in *Observed* and in *Observer*, but the effect is sharper for the former. It is interesting to notice that the gender of the agent has an impact on choices of those in *Observed*, with an higher amount returned by the females, but not on the behavior of those in *Observer*. The lower panel in Table 5 informs us that beliefs about the action undertaken by similar others have a positive impact on the likelihood of observing a positive return. The impact is, in qualitative terms, stronger for lower trust levels. The other dimensions do not systematically impact on the likelihood of reciprocating agent's choice.

Table 6 presents a summary of a regression estimations of factors affecting agents' choices, with a focus on choices directly observed by the decision maker.

[Table 6 about here]

The upper panel in Table 6 inform us about the fact that no statistically significant social effects are observed in the data. It must be noticed that also the other estimated coefficients are not statistically significant. The hurdle component informs us that beliefs about the behavior of the others positively impact on the decision to deviate from the standard selfish benchmark. Overall, the estimation provides us with a poor account of the determinants of choices of those in *Observer* (see also the Wald tests in Table 6).

4 Discussion and Conclusions

The trust-based interaction under investigation (i.e., a modification of the Investment Game) allows us to assess the relevance of social effects in the reciprocity-laden choices of the agents following the trust-laden choice of the principal. The results of two distinct experiments were presented. In terms of the interaction setting, the main difference between the two is the rule adopted for the computations of players' payoffs. In *Exp.I*, the choices of four agents in a group cumulatively contribute to the definition of the principal's earnings. In *Exp.II*, only one agent in a group of four is randomly chosen to affect the earnings of a principal. Concerning profitability of the investment, it must be noticed that average returns in *Exp.I* are positive for each investment level. On the contrary, in *Exp.II* the average amount returned by the agents is always smaller than the amount potentially invested by the principal. Thus, while the average amount returned in *Exp.I* is smaller than in *Exp.II*, the agents do not decrease their contribution so as to keep the total profitability of the investment constant across the two specifications. This aspect deserves some further investigation in the light of allocational models that stem from equity considerations (e.g., Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000).

Concerning the impact of social effects on agents' choices, two main hypotheses lead the experimental research. On the one side, peer pressure is expected to raise the amount returned by the agents being aware that their choices are observed by peers. On the other side, due to social spillovers, actions of those being aware that their choices are observed are expected to affect choices of those observing them.

With reference to peer pressure, what emerged from *Exp.I* is that those whose choices are observed tend to reciprocate more than other agents in the experiment. The difference is more pronounced for higher investment levels. On the contrary, in *Exp.II* returns of those whose choices are observed are smaller than returns of agents in the baseline conditions, with a more pronounced effect for the highest investment level. This suggests that peer pressure is mediated by the involvement of peers who are observing the choices. In *Exp.I* all the agents share the same fate and know that all their choices will be implemented. Differently, in *Exp.II* the agents know that only one of the choices in the group will be implemented. In the light of previous contributions in the domain of social psychology (e.g., Hornsey *et al.*, 2003) it may be argued that sharing a common fate increases the group identity and this, in turn, increases the leverage of peer pressure.

With reference to social spillovers in choices, an interaction between choices is registered only in *Exp.I*. However, the positive impact that observed choices

have on those observing them is quite moderate in magnitude and, moreover, the amount sent by those observing others' choices is overall smaller than the amount sent by those whose choices are observed. Thus, in *Exp.I* a moderate crowding-in of reciprocal choices is registered. This result is in line with previous findings (Gächter *et al.*, 2009). In *Exp.II* no interaction at the action level is registered but a positive correlation between beliefs about the behavior of others' in the same condition and choices is observed. This is associated with a positive gap between average expectations and actual choices. These two observations, when jointly taken, suggest that decision makers are positively influenced by what they think the others are doing but, at the same time, do not aim at reaching the same reciprocity levels they expect from the others.

To conclude, the two experiments highlight some patterns of social effect in trust-reciprocity interactions. Differences in the payoff structure of the two experiments seem likely to interact with social effects and reciprocity. This suggests that an interplay between allocational considerations, peers conduct and reciprocity attitudes is at work in the context under examination. Further research on these interrelated aspects is needed to improve the understanding of other regarding attitudes in domains characterized by social interactions.

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A Instructions (English Translation)

A.1 Exp.I

Welcome,

2.50 EURO were given to you for showing-up on time for the experiment.

We kindly ask you to read these instructions carefully and without speaking with other participants. Communication with other participants is not allowed. If you have doubts or you want to ask a question please raise your hand. A member of the staff will answer to your question privately. Any behavior intentionally affecting the regular conduct of the experiment will be sanctioned with the expulsion without payment.

The experiment allows you to earn an amount of EURO. The amount of EURO you are going to earn will depend on your decisions and on decisions of other participants. Both your choices and choices of the others will remain anonymous and will never be associated to your name.

In the experiment, instead of EURO, you are going to use ECU (Experimental Currency Units). At the end of the experiment 2 ECU will be exchanged with 1 EURO (as an example, for an earning of 5 ECU you will receive a real earning of 2.5 EURO)

In the experiment you are matched with other 4 participants and, thus, you will form a group of 5 participants. A role in the experiment will be randomly assigned to each of the participants in the group. The given role will be maintained by each participants throughout the experiment. In more details, one participants will be assigned the role A and the other 4 participants will be assigned the role B. Here following the participants with role A are called *Subject A* and the participants with role B are called *Subject B*.

Actions of the Participants

The Subject A and each Subject B in a group receive an initial endowment of 10 ECU.

Actions of Subject A

The Subject A has to choose, among 4 possible alternatives, how much to send to the 4 Subjects B in her group

- 0 ECU
- 4 ECU
- 6 ECU
- 10 ECU

The amount sent will be multiplied by 4 and the result will be equally shared among the four Subjects B belonging to the same group of Subject A.

After having chosen how much to send, each Subject A will be asked to report the amount she expects to receive in total from the four Subjects B with whom she is matched.

Actions of Subject B

Before knowing the actual amount sent by Subject A, each Subject B has to state how much she intends to send to Subject A for each of the possible amount that she could receive from Subject A. In particular, each Subject B has to declare how much she would send when receiving from the Subject A in her group, 4 ECU, 6 ECU, or 10 ECU, respectively. The amount sent by Subject B can range from 0 to the amount sent by Subject A.

[Baseline: *The choices of each Subject B are not observed by the other Subjects B and only the total amount sent by the four Subjects B will be known by Subject A.*]

[PeerView1 & PeerView2: *2 Subjects in each group will be randomly drawn to observe the choices of one of the 2 Subjects B not drawn. In particular, a Subject B "observer" will know the choice of a Subject B "observed" and the other Subject B "observer" will know the choice of the other Subject B "observed".*]

[PeerView1: *Before choosing, the Subjects B will be informed about their role of "observed" or, alternatively, of "observer". Both the Subjects B "observers" and the Subjects B "observed" are asked to choose. After having chosen, each Subject B "observer" will be informed about the choice of the Subject B "observed" matched with her. After having observed the choice, the Subject B "observer" will decide whether to confirm or modify her choice.*

Only the total amount sent, which originates from the first—and only—choice of the subjects "observed" and from the second choice of subjects "non-observed", will be known by the Subject A.]

[PeerView2: *Before choosing, the Subjects B will be informed about their role of "observed" or, alternatively, of "observer". The Subjects B "observed" are asked to choose. After the Subjects B "observed" have chosen, each Subject B "observer" will be informed about the choice of the Subject B "observed" matched with her. After having observed the choice, the Subject B "observer" will be asked to choose.*

The total amount sent by "observed" subject and "non-observed" will be known by the Subject A.]

After having chosen the amount to be sent, each Subject B has to state how much she thinks the Subject A expects to receive in total from the Subjects B. This estimation must be stated for each possible amount that Subject A can send.

[PeerView1: *The Subject B "observer" must report her estimation both after having chosen for the first time and after having observed the choice of the Subject B with whom she is matched and having reported her choice for the second time.*]

Earnings of the Participants

The experiment ends with the computation of earnings of the participants.

Earnings of Subject A

The earnings of Subject A are given by the initial endowment decreased by the amount sent to the 4 Subjects B and increased by the amount sent by the four

Subjects B. The amount sent by the four Subjects B is defined accordingly to the actual choice of the Subject A.

[PeerView1: *With reference to the Subjects B "observers", only the choices made after having observed the choices of the Subjects B "observed" will be taken into account when computing earnings in the experiment.*]

In addition, 2 ECU will be assigned to the Subject A that correctly estimates the total amount sent by the four Subjects B with whom she is matched.

Earnings of Subject B

The earnings of each Subject B are given by the initial endowment increased by the amount sent by Subject A and decreased by the amount sent to Subject A. The amount sent to Subject A is defined accordingly to the actual choice of the Subject A with whom she is matched.

[PeerView1: *With reference to the Subjects B "observers", only the choices made after having observed the choices of the Subjects B "observed" will be taken into account when computing earnings in the experiment.*]

In addition, 2 ECU will be assigned to each Subject B whom correctly estimates the amount that Subject A is expecting to receive from the four Subjects B matched with Subject A.

[PeerView1: *For each Subject B "observer" one of the two estimations reported will be randomly drawn and employed for computing the payoff.*]

Control Questionnaire

Before the starting of the experiment you will be asked to answer some questions to check the understanding of the instructions. The answers to the questionnaire will not directly affect your earnings. However, the experiment will not start until all the participants have correctly answered the questions.

A.2 Exp.II

Welcome,

We kindly ask you to read these instructions carefully and without speaking with other participants. Communication with other participants is not allowed. If you have doubts or you want to ask a question please raise your hand. A member of the staff will answer to your question privately. Any behavior intentionally affecting the regular conduct of the experiment will be sanctioned with the expulsion without payment.

The experiment allows you to earn an amount of EURO. The amount of EURO you are going to earn will depend on your decisions and on decisions of other participants. Both your choices and choices of the others will remain anonymous and will never be associated to your name.

In the experiment, instead of EURO, you are going to use ECU (Experimental Currency Units). At the end of the experiment 2 ECU will be exchanged with 1 EURO (as an example, for an earning of 5 ECU you will receive a real earning of 2.5 EURO)

In the experiment you are matched with other 4 participants and, thus, you will form a group of 5 participants. A role in the experiment will be randomly

assigned to each of the participants in the group. The given role will be maintained by each participants throughout the experiment. In more details, one participants will be assigned the role A and the other 4 participants will be assigned the role B. Here following the participants with role A are called *Subject A* and the participants with role B are called *Subject B*.

The experiment is divided into two phases. At the end of the first phase you will get the instructions for the second phase. The earnings obtained in the first phase are not affected by the second phase.

Phase 1

Actions of the Participants

The Subject A and each Subject B in a group receive an initial endowment of 10 ECU.

Actions of Subject A

The Subject A has to choose how much to send among 4 possible alternatives

- 0 ECU
- 4 ECU
- 6 ECU
- 10 ECU

The amount sent will be subtracted from the initial endowment of Subject A, multiplied by 3 and the resultant will be assigned to one of the 4 Subjects B randomly chosen. The Subjects B will know whether they have been drawn to obtain the amount sent by the Subject A only at the end of the experiment.

Actions of Subject B

Before knowing the actual amount sent by Subject A, each Subject B has to state how much she intends to send to Subject A for each amount that the Subject A can potentially send. In particular, each Subject B has to state how much she would send when the Subject A in her group sent 4 ECU, 6 ECU, or 10 ECU, respectively. The amount sent by Subject B can range from 0 to 3 times the amount sent by Subject A. Choices must be expressed as integer numbers.

[Baseline: *The choices of each Subject B are not known by the other Subjects B.*]

[PeerView: *2 Subject B in each group are randomly drawn. The 2 Subjects B drawn are henceforth called Subjects B observers, while the Subjects B not drawn are called Subjects B observed. A Subject B observer will know, before choosing, the choice of a Subject B observed. The other Subject B observer will know, before choosing, the choices of the other Subject B observed. In more details, the Subject B observed are asked to choose at first. Then, after the Subjects B observed have chosen, each Subject B observer may see the choice*

of the Subject B being matched with her. After having seen the choice, the Subject B observer has to state her choice.]

Earnings of the Participants

The earnings of the participants in phase 1 are privately communicated only at the end of the experiment.

Earnings of Subject A

Only choices of the Subject B randomly drawn in correspondence to the amount sent by Subject A are taken into account to assess the earnings of Subject A. In particular, the earnings of Subject A will be given by her initial endowment, decreased by the amount sent to Subject B and increased by the amount sent by Subject B.

Earnings of Subject B

Only choices of the Subject B randomly drawn in correspondence to the amount sent by Subject A are taken into account to assess the earnings of the Subject B randomly drawn. In particular, the earnings of the Subject B randomly drawn are given by her initial endowment increased by the amount sent by Subject A multiplied by 3 and decreased by the amount sent to the Subject A.

The 3 Subjects B that are not drawn will earn their initial endowment of 10 ECU, independently of choices made.

Control Questionnaire

Before the starting of the experiment you will be asked to answer some questions to check the understanding of the instructions. The answers to the questionnaire will not directly affect your earnings. However, the experiment will not start until all the participants have correctly answered the questions.

The experiment is divided into 2 phases. The phase you are going to face is the second and last one.

Phase 2

Actions of the participants

In Phase 2 both Subjects A and Subjects B are asked to state some expectations about the choices of other participants in the first phase of the experiment. In this phase it will be possible to obtain a maximum earning of 8 ECU. A detailed explanation of the way in which expectations about others' behavior should be reported and the procedure adopted to compute earnings in this phase is given below.

Expectations of Subject A

The Subject A in the interaction has to state her expectations about the average amount sent by the Subjects B in the experiment (thus, not only by Subjects B in her group). The distribution of the amount potentially sent by Subject B is divided into intervals. The expectations are to be reported as probabilities assigned to each interval. The probabilities assigned to each interval must be between 0 and 100 and their sum must be equal to 100.

As an example, if A sent 4 UMS the distribution of the average amount potentially sent by Subjects B would be between 0 and 12 and the distribution would be divided into 4 intervals: $[0-3), [3-6), [6-9), [9-12]$. Whenever Subject A thinks that the average amount returned falls in each of the 4 intervals, she should assign a positive probability to each interval, giving higher probabilities to the interval judged as more likely. Whenever Subject A thinks that the average amount returned falls with certainty in one of the intervals, all the probabilities must be assigned to that interval.

The estimations as above described are to be stated for each positive amount potentially sent by Subject A.

Expectations of Subject B

The Subject B in the interaction has to state her expectations about the average amount sent by Subjects B in the experiment (thus, not only by Subjects B in her group).

[PeerView: *Only Subjects B sharing the same condition of the decision maker must be taken into account in the estimation. Practically speaking, observer Subjects B must report an estimation about the observers in the experiment and observed Subjects B must report an estimation about observed Subject B.*]

The procedure employed to report expectations is like the one employed for Subject A.

Earnings of the participants

The experiment ends with the computation of participants' earnings. Both for Subjects A and for Subjects B, earnings are computed by employing a rule that rewards the truthful expression of one's own expectations. The rule is the following

$$earnings\ (in\ UMS) = 8 - \frac{4}{10000}\Big(\sum_{k \in K}(I_k - p_k)^2\Big)$$

where K is the set of intervals, p_k is the probability assigned to the interval k, I_k is equal to 100 when the average amount to be estimated fall in the interval k, and is equal to 0 otherwise.

The maximum earnings in this phase are equal to 8 ECU. These earnings are obtained when the maximum probability (100) is associated to the interval comprising the average amount actually sent in phase 1 by the participants whose choices are to be estimated. The minimum earnings in this phase are equal to 0 ECU. This result is obtained when the maximum probability is associated to the interval that does not comprise the amount actually sent in phase 1 by the participants whose choices are to be estimated. In all other cases, the

earnings are between 0 and 8 ECU and are defined according to the equation above reported.

Only one of the estimations reported for each positive amount sent by Subject A will be randomly drawn for payment.

Control Questionnaire

Before the starting of the experiment you will be asked to answer some questions to check the understanding of the instructions. The answers to the questionnaire will not directly affect your earnings. However, the experiment will not start until all the participants have correctly answered the questions.

B Tables

Table 1: Descriptive Statistics of Amount Returned by the Agents (*Exp.I*)

Condition	N	Mean	Median	Std.Dev.
	Principal's Offer = 4			
Baseline	32	1.031	0.000	1.448
PeerView1 Observed	32	1.594	1.000	1.316
PeerView2 Observed	16	1.750	1.000	1.693
PeerView1 Observer CT	32	1.344	1.000	1.578
PeerView1 Observer	32	1.188	0.500	1.554
PeerView2 Observer	16	0.812	0.000	1.167
	Principal's Offer = 6			
Baseline	32	1.844	1.000	2.142
PeerView1 Observed	32	2.344	2.000	1.696
PeerView2 Observed	16	3.188	3.000	1.974
PeerView1 Observer CT	32	2.219	2.000	1.913
PeerView1 Observer	32	1.906	1.500	1.957
PeerView2 Observer	16	1.688	1.500	1.887
	Principal's Offer = 10			
Baseline	32	3.062	2.000	3.121
PeerView1 Observed	32	3.844	4.000	2.541
PeerView2 Observed	16	5.562	4.500	2.874
PeerView1 Observer CT	32	2.812	2.000	2.546
PeerView1 Observer	32	2.719	2.000	2.556
PeerView2 Observer	16	3.125	3.500	2.825

Table 2: Descriptive Statistics of Average Beliefs (*Exp.II*)

Role	Condition	N	Mean	Median	Std.Dev.
		Principal's Offer = 4			
Agent					
	Baseline	32	4.277	4.215	1.632
	PeerView Observed	30	4.558	4.800	1.612
	PeerView Observer	30	4.280	4.260	1.741
Principal					
	Baseline	8	5.794	5.475	2.415
	PeerView	15	4.900	4.500	2.067
		Principal's Offer = 6			
Agent					
	Baseline	32	6.439	6.900	3.084
	PeerView Observed	30	6.618	7.050	2.652
	PeerView Observer	30	6.483	6.900	3.026
Principal					
	Baseline	8	7.725	8.400	2.317
	PeerView	15	7.814	9.000	3.285
		Principal's Offer = 10			
Agent					
	Baseline	32	10.130	10.575	6.195
	PeerView Observed	30	11.088	10.935	5.313
	PeerView Observer	30	9.655	10.650	4.706
Principal					
	Baseline	8	14.119	15.000	4.496
	PeerView	15	12.706	14.100	6.705

Table 3: Agent's Reciprocal Behavior (*Exp.I*)

	Coeff (Std. Err.)					
	4		6		10	
	Obsd	Obsr	Obsd	Obsr	Obsd	Obsr
	Count component					
Observed	0.321(0.218)		0.268(0.166)		0.265(0.127)**	
Observer		0.050(1.720)		-0.021(0.197)		0.001(0.142)
Beliefs	0.116(0.017)***	0.118(0.033)***	0.066(0.010)***	0.066(0.015)***	0.038(0.005)***	0.039(0.006)***
Female	0.119(0.207)	0.262(0.303)	0.327(0.159)**	0.115(0.197)	0.126(0.117)	0.044(0.143)
Age	0.017(0.026)	0.027(0.066)	0.008(0.021)	0.040(0.046)	0.014(0.016)	0.018(0.026)
Intercept	-1.391(0.645)**	-1.481(1.720)	-0.558(0.536)	-0.932(1.186)	-0.017(0.397)	0.098(0.672)
	Hurdle component					
Observed						
Observer		-0.237(0.515)		-0.145(0.517)		-0.227(0.554)
Beliefs		0.154(0.053)***		0.083(0.039)**		0.034(0.025)
Female		0.674(0.494)		1.079(0.511)**		0.729(0.552)
Age		0.146(0.107)		0.081(0.102)		0.210(0.141)
Intercept		-4.825(2.644)*		-2.644(2.537)		-4.586(3.325)
Obs	80	80	80	80	80	80
WT Pr($> chisq$)	< 0.001	0.004	< 0.001	< 0.001	< 0.001	< 0.001
Model	P	HP+	P	HP+	P	HP

***(1%); **(5%); *(10%) significance level

Table 4: Observers' Behavior (*Exp.I*)

	Coeff (Std. Err.)		
	4	6	10
	Count component		
Amount.observed	0.285(0.126)**	0.133(0.068)**	0.058(0.033)*
Beliefs	0.059(0.034)*	0.026(0.014)*	0.007(0.007)
Female	0.473(0.433)	0.236(0.258)	0.261(0.189)
Age	0.006(0.086)	-0.027(0.056)	-0.003(0.041)
Intercept	-0.826(2.298)	0.878(1.384)	0.877(1.025)
	Hurdle component		
Amount.observed	0.066(0.218)	0.179(0.186)	0.146(0.141)
Beliefs	0.061(0.056)	0.008(0.039)	0.017(0.027)
Female	0.863(0.625)	1.312(0.669)**	0.840(0.707)
Age	0.213(0.150)	0.196(0.158)	0.128(0.162)
Intercept	-5.980(3.688)	-5.230(3.812)	-3.181(3.962)
Obs	48	48	48
WT Pr($> chisq$)	0.024	0.084	0.171
Model	HP	HP	HP

***(1%); **(5%); *(10%) significance level

Table 5: Agent's Behavior (*Exp.II*)

	Coeff (Std. Err.)					
	4		6		10	
	Obsd	Obsr	Obsd	Obsr	Obsd	Obsr
			Count component			
Observed	-0.145(0.153)		-0.119(0.181)		-0.435(0.183)**	
Observer		-0.138(0.170)		-0.175(0.173)		-0.347(0.194)*
Beliefs	0.111(0.052)**	0.079(0.055)	0.055(0.037)	0.016(0.033)	0.060(0.016)***	0.047(0.019)**
Female	0.367(0.154)**	-0.174(0.182)	0.369(0.181)**	0.077(0.176)	0.337(0.183)*	0.106(0.207)
Age	0.066(0.030)**	0.023(0.038)	0.035(0.034)	0.014(0.038)	0.057(0.035)	0.010(0.044)
Intercept	-0.775(0.768)	0.620(1.008)	0.416(0.871)	1.304(0.964)	0.188(0.875)	1.506(1.114)
			Hurdle component			
Observed	-0.124(0.635)		0.219(0.733)		0.845(0.821)	
Observer		-0.403(0.632)		-0.645(0.687)		-0.845(0.685)
Beliefs	0.683(0.235)***	0.685(0.229)***	0.354(0.140)**	0.435(0.131)***	0.197(0.083)**	0.241(0.076)***
Female	0.102(0.662)	0.747(0.682)	-0.987(0.781)	-0.072(0.726)	-0.889(0.808)	-0.351(0.715)
Age	0.017(0.126)	-0.065(0.153)	0.034(0.142)	-0.062(0.168)	-0.084(0.155)	-0.067(0.168)
Intercept	-2.199(3.205)	-0.599(3.913)	-0.887(3.437)	0.410(4.172)	2.133(3.692)	1.117(4.127)
Obs	62	62	62	62	62	62
WT Pr($> chisq$)	0.016	0.135	0.196	0.858	0.003	0.069
Model	HP	HP+	HNB	HNB+	HNB	HNB+

***(1%); **(5%); *(10%) significance level

Table 6: Agent's Behavior (*Exp.II*)

	Coeff (Std. Err.)		
	4	6	10
		Count component	
Amount.observed	-0.041(0.051)	0.005(0.027)	0.023(0.019)
Beliefs	0.132(0.098)	0.034(0.043)	0.033(0.038)
Female	-0.255(0.279)	-0.003(0.211)	0.129(0.238)
Age	-0.108(0.078)	-0.042(0.056)	-0.021(0.058)
Intercept	3.332(1.916)*	2.284(1.366)*	1.839(1.480)
		Hurdle component	
Amount.observed	0.048(0.175)	-0.062(0.148)	0.104(0.111)
Beliefs	0.679(0.333)**	0.747(0.279)***	0.922(0.390)**
Female	1.391(1.039)	0.874(1.231)	0.359(1.544)
Age	0.074(0.250)	0.187(0.311)	0.739(0.489)
Intercept	-4.676(6.278)	-7.860(7.725)	-24.815(14.074)*
Obs	30	30	30
WT Pr($> chisq$)	0.097	0.790	0.670
Model	HP	HP	HNB

***(1%); **(5%); *(10%) significance level

C Figures

Figure 1: Agent's Amount returned (*Exp.I*)

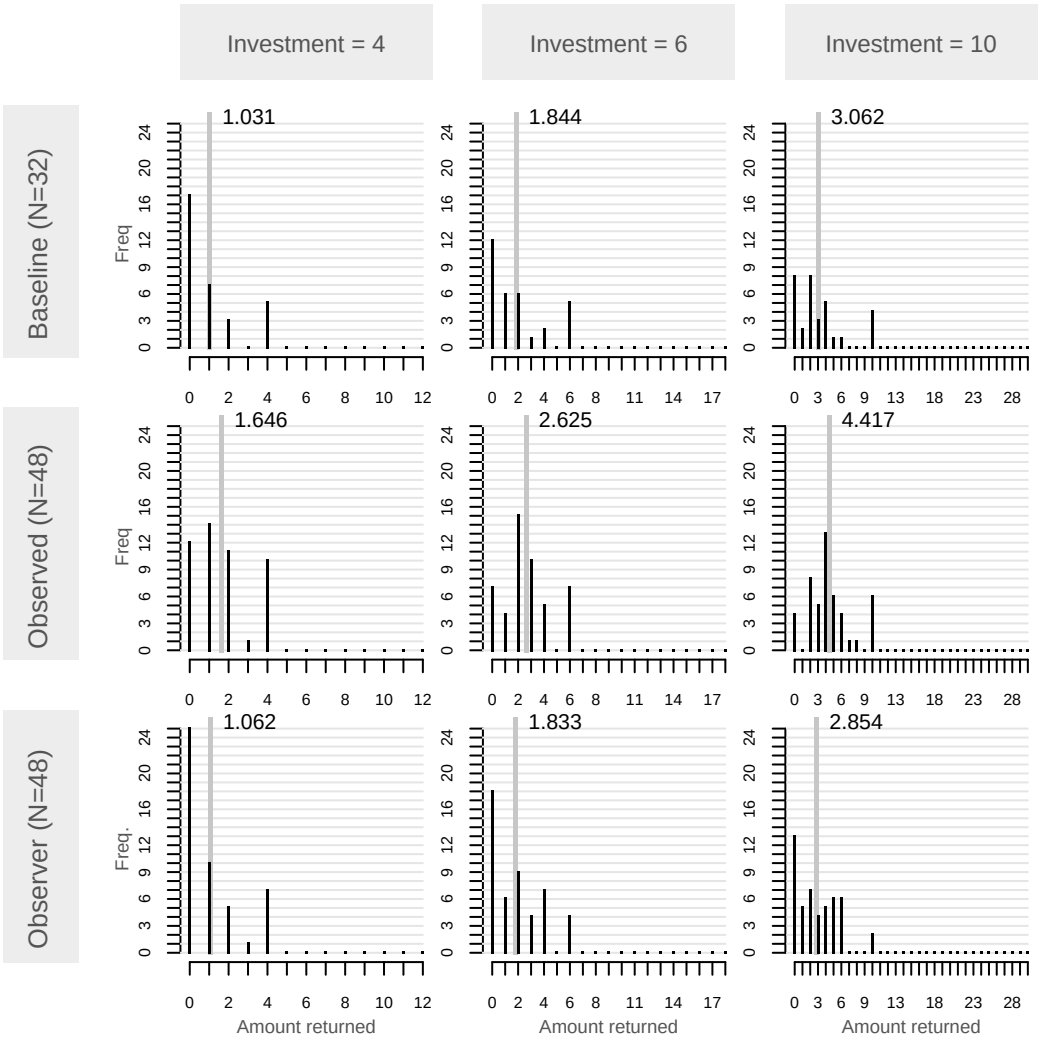

Figure 2: Principal's Investment level (*Exp.I*)

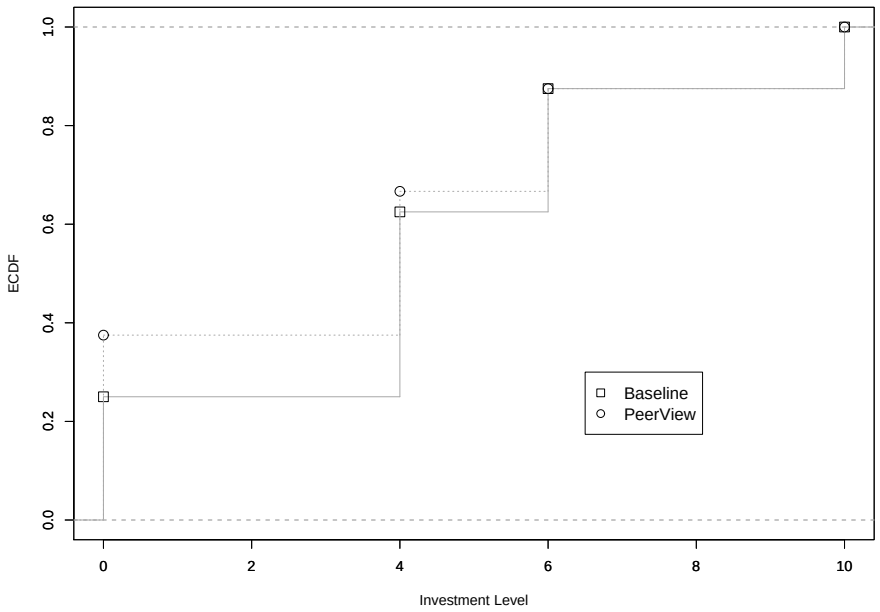

Figure 3: Agent's Amount returned (*Exp.II*)

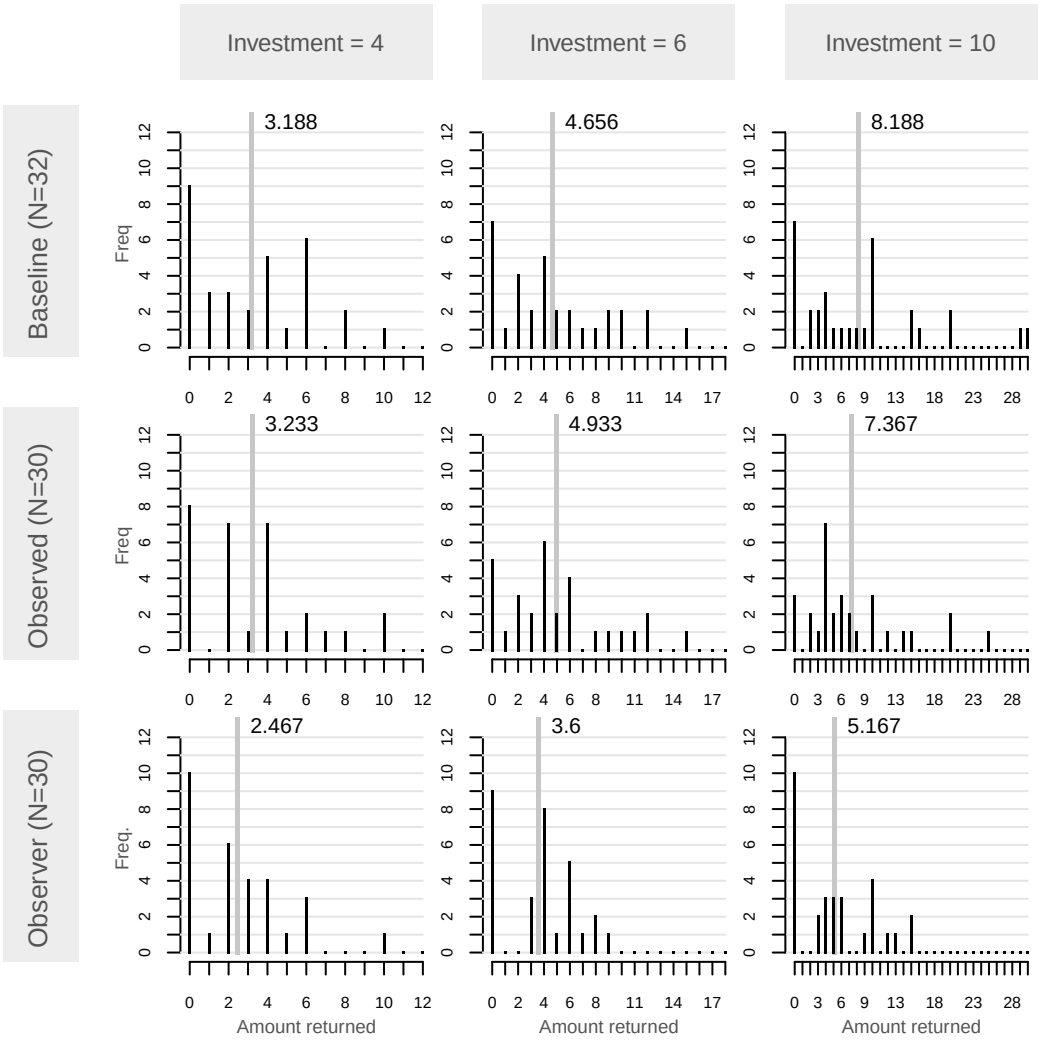

Figure 4: Principal's Investment level (*Exp.II*)