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CONDITIONAL AND UNCONDITIONAL OTHER REGARDING PREFERENCES: A QUALITATIVE ANALYSIS⁺

Abstract. Our paper investigates the underlying motivations of social interactions. By using a qualitative approach, we discuss the relevance of conditional (trust and reciprocity) and unconditional (altruism and inequality-aversion) motivations in investment games. Specifically, self-reported questionnaires and free subjects' comments are used to discuss the coherence between observed behavior, declared motivations and beliefs of participants. We find a strong coherence between experimental outcomes and the qualitative information obtained from participants. Both are consistent with motivations based on other-regarding preferences.

Keywords: conditional and unconditional other-regarding preferences, survey, investment game.

1. Introduction

The idea of other-regarding preferences is one of the most important foundations for a revision of economic theory based on psychological influence as proposed by *behavioral economics*. Experimental evidence is in fact consistent with economic rationality once inter-personal and non-selfish motivations are introduced (Levine, 2009). However, different theoretical models (based on different motivations consistent with other-regarding preferences) are able to replicate experimental outcomes, as argued by, among others, Cox (2004) and Manski (2002).

Our paper aims to investigate the underlying motivations of behavior observed in investment games introduced by Berg et al., (1995). In particular, by using a qualitative approach, we attempt to discriminate between motivations based on conditional and unconditional other-regarding preferences. We elicit information about participants' motivations by using questionnaires and then we relate this information to observed behaviors.

Conditional motivations induce actions that depend on the (actual or expected) behavior of others. By contrast, unconditional motivations induce actions independently of the actions of others. As pointed out by Cox (2004), in investment games, investors could send positive amounts because they want to trigger trust and reciprocity mechanisms (conditional motivation) or because they are motivated by altruism or inequality aversion (unconditional motivation).

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By using a set of self-reported information about participants' behavior, we attempt to test the coherence between experiment outcomes and participants' claims about trust and reciprocity, as conditional motivations, distinguishing them from altruism and inequality aversion, as unconditional motivations.

Although observations from the outcomes of experimental design make conditional and unconditional motivations difficult to distinguish, the point is fundamental in evaluating the different theories. Evaluating the impact of conditional and unconditional motivations is crucial for testing the validity of new economic approaches, both cognitive and behavioral, which differ from several views of decision-making processes (Camerer et al., 2005).

Cox (2004) disentangles conditional and unconditional motivations in an investment game by using a quantitative approach (the triadic design). According to his design, evidence consistent with conditional motivations (i.e., trust) is obtained from the difference between the average amounts sent by investors and dictators in a counter-factual game. The idea is that in a counter-factual dictator game, since payback is not expected, a dictator's behavior can only be explained by unconditional motivation. In a similar way, i.e., constructing an appropriate counter-factual game that only depends on unconditional motivation, Cox obtains evidence consistent with reciprocity.¹

A critical remark to Cox's approach is posed by Fehr (2009) who sustains that it is not implausible that the trust game puts subjects in a very different mental frame compared to the dictator game. While the trust game is likely to trigger a social exchange frame ("If I trust you and you are trustworthy we are both better off") the dictator game may trigger a helping or generosity frame absent in the trust game. Therefore, Fehr (2009) argues that the difference between the transfers in the two games may understate behavioral trust.

As pointed out by Cox (2004), however, the logic of the triadic design is to provide sufficient but not necessary conditions for the outside observer to be able to conclude from experimental observations that subjects have exhibited trust or reciprocity. Since other studies have reported mixed evidence from Cox's approach, the triadic design may suffer from noise that may differently impact actions in the different counterfactual scenarios.

An alternative approach for distinguishing the underlying motivations in the experiments is based on the information derived from surveys that contain direct questions on trust or trust attitude.² Glaeser et al., (2000), for instance, combine experiments and surveys to measure trust and trustworthiness. They find that attitudinal surveys may be useful for predicting agents' behavior in the investment game. Fehr et al., (2002) find that survey-based measures of trust are correlated with the sender's behavior in a trust game. Similarly, Capra et al., (2008) control for altruism using the triadic design introduced by Cox (2004), they find that most attitudinal questions are good predictors of trusting actions. They also find that some survey questions also predict behavior in binary trust games and cooperation in the public goods game.

Glaeser et al., (2000) and Capra et al., (2008) point out that experiments can be successfully integrated with surveys to measure individual-level variation in traditionally hard-to-measure characteristics such as trust and trustworthiness. Similarly, Fehr (2009) points out that survey measures of trust are predicted by risk

¹ Di Bartolomeo and Papa (2016) refine Cox's (2004) design to account for inequality aversion.

² The most frequently used measure is taken from the American General Social Survey (GSS) and the World Values Survey (WVS) which have been widely used to measure cross-cultural differences in trust.

preferences and measures of betrayal aversion (people dislike non-reciprocated trust) as much as behavioral measures of trust (social preferences) that are derived from the trust game. His findings suggest that survey measures do not just capture beliefs about people's trustworthiness but are also influenced by their preferences. He reports that in a trust game preference measures do not affect beliefs about others' trustworthiness, thus, he sustains that one should ask trustors and trustees directly about the trustworthiness of trustees in trust games.

Chuang and Schechter (2015) and Falk et al., (2016) suggest combining the outcomes from incentivized experiments with those obtained from surveys. Chuang and Schechter (2015) debate the issue regarding risk preference stability. Falk et al., (2016) experimentally validated survey methods to measure risk aversion, discounting, trust, altruism, and positive and negative reciprocity. The advantage of their approach is that they are able to capture preferences in a reliable, parsimonious and cost-effective way. The role of self-reported surveys in incentivized experiments is also pointed out by Fehr et al., (2002), Dohmen et al., (2009, 2011) and Vischer et al., (2013).

As in Glaeser et al., (2000) and other mentioned papers in different contexts, we combine an investment game and a survey to distinguish conditional motivations (trust and reciprocity) from unconditional motivations (altruism and inequality aversion) by comparing the outcomes (average amounts sent by trustors and trustees) to those derived from participants' surveys. In our survey we ask trustors and trustees about their beliefs and motivations and about their partner's behavior.

The remainder of the paper is structured as follows. Section 2 describes our experiment and the methodology used to distinguish between conditional and unconditional other-regarding preferences in an investment game. Section 3 illustrates the main outcomes of our experiments. Section 4 concludes.

2. Design and procedures

2.1 Research design

Our design consists of a single treatment. We replicate the well-known investment game introduced by Berg et al., (1995) and elicit information about participants' motivations by using questionnaires. The treatment involves two players (A and B), based on perfect information. For the sake of brevity, we refer to A as "she" and B as "he". The game is explained below.

Definition (investment game). Both agents are initially endowed with 10 tokens. The value of each token is 0,50 euro. In the first stage, A can transfer to B any integral number of her endowment (i.e., from 0 to 10 tokens) keeping the remainder. Any amount transferred is multiplied by 3 before being delivered to B. In the second stage, B could return part, all or none of the tripled amount received from A.

If participants are selfish the perfect sub-game Nash equilibrium implies that nothing is sent by A. The proof is trivial. We test if the agents are selfish as follows:

H0: A (B) is selfish: $S_A = 0$ ($S_B = 0$)

where S_Y is the amount sent by Y in the investment game.

Consider the case where H0 is rejected, positive amounts sent are observed. Assuming that participants are rational, they should have other-regarding

preferences. In such a case, positive amounts sent by A or B can be motivated by both conditional or unconditional other-regarding preferences.

1. *Assumption (trust vs. altruism)*. Player A may transfer tokens to B for two reasons: she trusts that some of the tripled amount transferred will be returned (trust or conditional other-regarding preferences) or she is motivated by unconditional “altruistic” other-regarding preferences.

2. *Assumption (reciprocity vs. altruism)*. In the same manner, B returns part of the tripled amount transferred because he is motivated by reciprocity (B may understand A’s underlying motivation and could send a positive payback in response to trusting behavior) or unconditional other-regarding preferences (altruism or inequality aversion).

By using self-reported information collected during the experiment, we discriminate between transfers motivated by conditional (trust and reciprocity) and unconditional other-regarding preferences (altruism or inequality aversion). Specifically, participants were requested to fill out surveys twice: after trust decisions were made (intermediate questionnaire) and after trustworthiness decisions were made (final questionnaire).

We ask trustors and trustees to fill out their motivations about each feasible choice, their beliefs about the partner’s feasible choice. We test if outcomes of the investment game are correlated with the outcomes of results of the attitudinal survey and participants’ anonymous comments used to indirectly understand participants’ motivations and beliefs.

A summary of the surveys is as follows.

- 1) We ask for A’s motivation of her action (intermediate questionnaire);
- 2) We ask for A’s beliefs of B’s action (intermediate questionnaire);
- 3) We ask for B’s motivation of his action (final questionnaire);
- 4) We ask for B’s beliefs about the counterpart motivation (final questionnaire);
- 5) We ask for A’s beliefs about the counterpart motivation (final questionnaire);

If trust and reciprocity emerge from the outcomes of the investment game, social preferences can also be observed in comments associated with the attitudinal surveys.

2.2 Procedures

The participants were undergraduate students recruited by e-mail using lists of voluntary potential candidates from Sapienza University of Rome and the University of Teramo. Subjects were randomly selected from the database. In each university, we ran four sessions involving 18 participants. Therefore, 72 subjects participated in the experiment.

At the beginning of each session, subjects were required to provide identification cards. A database with names verified that there was no repeated participation. Then all the participants were divided into two groups (A and B) and placed randomly in two different rooms. Each group A subject was matched to a group B subject in a random and anonymous way. All the decisions made during the experiment were anonymous; anonymity was guaranteed by using identification codes, names remain unknown to all, including experimenter and controllers.

During the experiment, two assistants checked that the instructions were correctly followed by participants. However, they were not allowed to answer any questions. If participants had doubts, they could only read the instructions again. Participants were not allowed to talk to anyone throughout the experiment.

They were requested to fill out unpaid questionnaires. Information was collected twice: after decisions had been made (intermediate questionnaire) and before being paid (final questionnaire). The collected information has three functions: a) to provide additional data for interpreting the observed behavior, including beliefs and expectations; b) to provide a way of checking for possible subject confusion about the decision tasks; and c) to provide a way of checking for possible recording errors by the experimenters and counting errors by the subjects. Subjects do not write their names on the questionnaires, but use their codes.³ At the end of the experiment, after giving back instruction sheets, completed final questionnaires and signed participation sheets, all participants were paid.

We use a double-blind procedure. Using their codes, participants were paid by an administration office located in a separate building (the central administration of the university). Participants were aware that officers were unaware of the details for the reason for the payments or anything concerning the experiment.

3. Results

3.1 Testing selfishness

Table 1 reports our experimental outcomes. The Table indicates the average amount sent by participants A (Sent) and B (Returned). Standard deviations are indicated by squared brackets. All means are based on 36 observations.

Table 1. Parametric and nonparametric tests of first and second-mover data.

| | Sent | Returned |
|----------------|--------|----------|
| Average amount | 5,25 | 5,92 |
| | [2,67] | [5,93] |

The average amount sent by participants in role “A” is 5,25 tokens, whereas the average amount sent by the B participants is 5,92 tokens. These averages are clearly positive; therefore, as expected, outcomes are not consistent with the assumption of selfishness. By contrast, they are consistent with the idea of other-regarding preferences.

3.2 Self-reported motivations and beliefs

We use self-reported motivation and participants’ anonymous comments to investigate subjects’ motivations; in particular, we focus on trust and reciprocity (conditional other-regarding preferences) and altruism and inequality aversion (unconditional other-regarding preferences). Our qualitative information is used to indirectly understand participants’ motivations and beliefs.

Table 2 reports the motivations for subjects A and B. In line with the results of the previous section a relative small portion of the sample declares to act in a selfish way.

³ As in Cox (2004) the additional data provided by the questionnaires included the subjects’ payoff. Data error checks provided by the questionnaires come from asking the subjects to report the number of euros transferred, received and returned. These reports, together with two distinct records kept by the experimenters, provide accuracy checks on data recording.

Instead, cooperative motivations are predominant. A large proportion (61%) of A subjects declared that they were attempting to make an investment and 42% of recipients (B subjects) intended to reciprocate the investors.

Table 2. Answers to “How do you define your motivations?”

| Subjects A | % | Subjects B | % |
|---------------|------|--------------|------|
| Selfish | 0,11 | Selfish | 0,36 |
| Altruistic | 0,08 | Altruistic | 0,11 |
| An investment | 0,61 | Reciprocal | 0,42 |
| None of them | 0,19 | None of them | 0,11 |

According to the table, both subjects A and B are mainly motivated by other-regarding preferences. 70% of A subjects, in fact, declared they behaved according to other-regarding preferences (conditional 61%; unconditional 8%). Regarding B subjects, 53% of the cases are consistent with other-regarding preferences (conditional 42%; unconditional 11%). It is worth noting that the proportion of unconditional motivations is almost the same between subjects A and B. By contrast, the proportion of conditional motivations is different. This outcome is consistent with the idea that unconditional motivations like altruism are independent of the interaction, whereas conditional motivations are not. As a result, investments are a risky action in our game.

Table 3 illustrates participants’ beliefs about the motivations of others. At the end of the game, we ask the A subjects to comment on B’ s motivations and vice versa. In the table below the columns describe the answers of the participants.

Table 3. Answers to “How do you believe your counterpart behaved?”

| Subjects B about A | % | Subjects A about B | % |
|--------------------|------|--------------------|------|
| Selfish | 0,36 | Selfish | 0,50 |
| Altruistic | 0,17 | Altruistic | 0,06 |
| An investment | 0,39 | Reciprocal | 0,42 |
| None of them | 0,08 | None of them | 0,03 |

In Table 3, A subjects believe that B subjects have reciprocated (about 40% of all them); similarly, about the same amount of B subjects believe that A subjects made an investment. As in Table 2, the motivations are consistent with conditional other-regarding preferences.

Comparing Tables 2 and 3, similar outcomes emerge. Motivations are largely consistent with other-regarding preferences, but it seems that people tend to judge our actions as more motivated by other-regarding preferences (in particular, conditional) than the actions of others, which are more likely to be judged as selfish. For instance, A subjects motivate their behavior as selfish in 11% of the cases, but B subjects judge the behavior of A subjects as selfish in 36% of the cases. A similar difference is observed for: a) the behavior of B subjects (36% reports selfish motivation), and b) how A subjects judge the behavior of B (50% judge selfish behavior). This result can be explained as a self-evaluation bias: people tend to judge themselves in a more social positive way than the others.

Comments are also consistent with the existence of conditional motivations. Here we report some of them.⁴ A subject from group A commented on the choice to send three tokens by saying:

“I chose to send three tokens because I thought this was a safe choice. I feared that the other was selfish, but at the same time, I was hoping to receive back at least the tokens that I sent. I behaved in order to limit losses, but I also wanted to make an investment.”

The person above is clearly attempting to make an uncertain investment. He fears that the other will not reciprocate (in this case he should send zero), but he hopes that participant B will be reciprocal. Thus, he sends a small positive amount as the result of a decision making process that balances, on the one hand, the risk of facing a selfish agent with, on the other hand, the chance of matching someone who will reciprocate.

Another comment from a person from group A also clearly emphasizes the existence of conditional other-regarding preferences and that participants have fully understood them.

“I sent nine tokens. I trusted in the other player. I would have liked to send all the tokens, but I kept a small amount; one always needs to keep a safe asset as the other player could send me back nothing! However, my safe asset was very small (a token) - almost insignificant. Player B fully understood my intentions, by acting in such a way that he assured gains for both.”

Subject B, matched with player A above, comments on the experiment in a similar way.

“Player A was a good investor as, in the end, he/she took the risk of doubling his/her capital (I gave back 18 tokens) - however he/she did not risk all his/her capital (by keeping a very small part, a token). My choice was to cooperate by giving back half of our investment in response to his/her confidence.”

A subject of group B⁵ comments on his choices as follows:

“I gave back the same amount that participant A sent me, by holding the rest as profit.”

Although participant B was not generous, his actions were clearly conditional to agent A's behavior. Agent B, in fact, sent back the same amount received from agent A.

Some pairwise comments are reported in Table 4. Table 4 shows that the cooperative behavior is clear and understood by both participants. The comments highlight that they understand the risk of the choices of the A's agents, who often decide to cooperate and B participants to reciprocate their trust. Sometimes player B criticizes player A's risk aversion or gets the wrong idea about it - case 5 is a clear example of this kind of misunderstanding. Players often refer to trust and reciprocity and their actions are clearly conditional as well as their expectations about other people's behavior. Everybody knows that in the game there is a certain degree of risk (see, for example, A's comments in cases 1 and 4; B's comments in cases 2, 3 and 4) and that trust is needed or has to be compensated (see for example player B's comments in cases 1, 2, 3, and 6).

To summarize, a large part of the comments that we reported shows how the sample claimed to behave, led by conditional other-regarding preferences, whereas only a few pairs were motivated by altruism.

⁴ Other comments are similar to those selected. All the comments are available upon request.

⁵ He/she received three tokens.

Table 4. Comments on the experiment.

| Cases | Player A's comment | Player B's comment |
|-------|--|--|
| 1 | I didn't risk too much (4 coins), I expected that the other [player] would behave like me. Not take any risk is stupid behavior. After all, player B had nothing to lose as his/her initial endowment was safe: "to receive much, you must give much." | I gave back eight coins to A. I answered [player A's] trust. However, the best situation would have been if (player A) had sent me back six or seven coins. |
| 2 | By looking at the game outcome, I believe that the other player understood my intentions. By understanding my trust (seven coins), [player B] fully pays me off. Indeed [Player B's] action has been fulfilled more than my expectations. | I think player A faced more risk, because I have my endowment for free plus the additional coins sent [by player A]. Probably the player's intentions were to send me the greatest amount of coins so that I could at least return the same amount to him/her and so it has been ((so, I give him/her 10 coins). |
| 3 | If player B had not been aware of how much I had sent (ten coins), [player B] wouldn't have compensated me as he/she did. I have been lucky because my risk was great. | Player A made an extremely risky investment, close to be hasty, showing a great trust in the neighbors and a low risk aversion. In our specific case, both of us have been rewarded. I reciprocated by acting in a fair way, i.e., sending back the investment and half of the profit. |
| 4 | I chose to send a coin, because I do not know the kind of person I was facing. I tested if on the other side there was a person who, like me, would have equally shared the money. | Between risk and profit [Player A] chose to not invest a lot, by limiting my profit too. |
| 5 | Player B could have played better as I trusted him/her, but he/she behaved as a little bugger. | Player A has sent me only two coins (six after triplication). Sincerely I felt myself affronted by [player A's] choice. Thus I kept all the tokens. To gain my trust, player A should fully expose his/herself to the risk, given his/her precarious position. |
| 6 | I made my choice taking account of the possible choice of player B. After having considering all possibilities, I have chosen to trust by sending five coins. | I had not forecasted this behavior! I have reacted sending seven coins. |

3.3 Behaviors, expectations and motivations

We asked subjects A about their expected gains. Table 5 reports (declared) expected payoffs and (actual) amounts sent by subjects A distinguishing them by type of motivations according to their declarations. Investors confirmed their declarations as they expected large gains. They also sent larger amounts compared to participants influenced by cautions, altruism or other. Altruists have no gain expectations on the average, so they also seem to confirm their declarations.

Table 5. Behaviors, expected gains and types of participant A.

| | Expected payoff | Sent | Expected gain |
|----------|-----------------|------|---------------|
| Invest | 8,36 | 6,32 | 2,04 |
| Altruist | 3,67 | 3,67 | 0,00 |
| Caution | 4,25 | 3,75 | 0,50 |
| None | 4,43 | 3,43 | 1,00 |

The above results are in line with the self-reported declarations about behavior. Investors reported the largest expected gain consistently with conditional other-regarding preferences. By contrast, altruists have a “zero” expected gain consistently with the unconditional other-regarding preferences.

Table 6. Return ratio and types of participant A.

| Subjects A | Sent | Received | Average Return ratio |
|-------------|------|----------|----------------------|
| Full sample | 5,25 | 5,92 | 1,05 |
| Invest | 6,32 | 7,36 | 1,17 |
| Altruist | 3,67 | 2,33 | 0,64 |
| Selfish | 3,75 | 3,75 | 1,00 |
| None | 3,43 | 4,14 | 1,21 |

In Table 6 we show the average amount sent (first column) and sent back (second column) of different types of participants A. The third column shows the average return ratio of the full sample and their relative sub-samples. The results of the full sample show that participants who trust gained more tokens on average than those who did not, as the return ratio is larger than one.⁶ The sub-samples show that people who defined their behavior as an investment or “none of them,” obtain a return ratio greater than others (altruism and selfish).

Moreover, we collect also information from participants about ex ante expectations and ex post decisions. Specifically, we asked participants A: a) before being paid, what their expectations were about their payoffs; b) after being paid, if they had been able to, whether they would have changed their decision (and how).

We find that among the participants who experienced a negative difference between expected and actual payoffs, there is a significant difference between the amounts they sent and those they would have sent ex post.⁷ In particular, unsatisfied people, who received less than expected, would send 3,42 coins instead of 5,25. Although - as said - one could expect that unsatisfied people would like to change their actions, in our context this observed behavior proves that people are motivated by trusting behavior.

Table 7 reports the behaviors of B's subjects by type. Specifically, the first column shows the amount received; the second column reports the amount sent back; the third column shows the average return ratios.

Participants B sent more tokens on average than they received, as the return ratio of the full sample is greater than one. If they received more than on average, they returned more tokens, in fact, their return ratio is above the return ratio of the full

⁶ Results on return ratios are mixed (see Glaeser et al., 2000; Capra et al., 2008; Cardenas and Carpenter, 2008; Johnson and Mislin, 2011).

⁷ Subjects A, who realize their expected gains, are not willing to change their decisions.

sample. As a consequence, in line with self-reported motivations, they defined their decisions as altruistic and reciprocal.

Table 7. Behaviors and types of participant B.

| Subjects B | Received | Sent back | Average Return ratio |
|--------------|----------|-----------|----------------------|
| Full sample | 5,25 | 5,92 | 1,05 |
| Selfish | 4,69 | 1,77 | 0,48 |
| Altruistic | 6,50 | 10,00 | 1,56 |
| Reciprocal | 6,20 | 9,53 | 1,43 |
| None of them | 2,25 | 1,75 | 1,00 |

3. Concluding remarks

Our paper investigates the underlying motivations of social interactions by combining a qualitative approach with the quantitative outcomes derived from a lab experiment. As well as documented by experimental economists, human decisions are not only driven by selfishness. We compare the outcomes of an investment game and qualitative data about the subjects' motivations and beliefs. Specifically, we use self-reported questionnaires and subjects' comments to discuss the coherence between observed behaviors, declared motivations, and beliefs.

Combining quantitative and qualitative information, our outcomes provide evidence in favor of other-regarding preferences and help us to distinguish between conditional and unconditional motivations. The former seems to be more common in investment games.

Our paper also shows that the combination of qualitative information with the quantitative outcomes derived from experiments is a useful approach for raising our understanding of human interactions and provides many interesting insights. However, such insights obtained from a comparative analysis need to be further investigated by specific designs.

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