The triadic design to identify trust and reciprocity: Extensions and robustness

Giovanni Di Bartolomeo and Stefano Papa

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The triadic design to identify trust and reciprocity: Extensions and robustness.*

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Abstract.
Our paper reconsiders the triadic design proposed by Cox (2004) to identify trust and reciprocity in investment games. Specifically, we extend the design in two directions. First, we elicit expectations by a fixed-fee incentive scheme and test the coherence of them with the triadic outcomes. We expect that if trust is reported by the triadic design, investors’ expected gains should be also observed. Second, we collect information about participants’ choices by using both direct-response (as Cox) and strategy method. By the latter we are able to control reciprocity for initial inequality, which is endogenous when reciprocity is investigated. Finally, we test the existence of an emotional bias, i.e. we test if expectations mismatches induce participant to change actual choices from the planned ones.

Keywords: Conditional and unconditional motivations, other-regarding preferences, trust, reciprocity, investment game, expectation, inequality, strategy method.

JEL Codes D03, C91, D83.

1. Introduction
Observations from the experimental design make conditional and unconditional motivations hard to be distinguished in a clear way (Manski, 2002). For instance, in an investment game, investors may send positive amounts because they want to trigger trust mechanisms (conditional) or because they are just motivated by altruism or inequality aversion (unconditional).1

Cox (2004) proposes a triadic design to dis-angle conditional from unconditional motivations by comparing the outcomes of an investment game to those arising from counterfactual scenarios where actions can only be unconditional.2 Specifically, Cox

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1 The importance of determining the different nature of motivations is also stressed, among others, by Charness (2004).

2 See also Guth et al. (1982).
attempts to find evidence for (net or conditional) trust and reciprocity\(^3\) by assuming that in dictator games actions are only driven by unconditional motivations, then evidence for trust is obtained as a positive difference between the average amounts sent by investors and dictators. Similarly, evidence for reciprocity is obtained as the difference between the average amounts sent by trustees and dictators in a game where the initial endowments of dictators were built by the experimenter to replicate those faced by the trustees in the investment game.\(^4\)

The evidence from triadic designs is somehow mixed. Although some studies report evidence of conditional motivations,\(^5\) often experiments based on the triadic design fail in observing trust and reciprocity.\(^6\) These results seem to suggest that a major share of what has commonly been interpreted as trust-based transfers may be motivated only by altruism (Brulhart and Usunier, 2008, 2012). However, as pointed out by Cox (2004), the logic of the triadic design is to provide sufficient but not necessary conditions for the outside observer to be able to conclude from experiment observations that subjects have exhibited trust or reciprocity. Thus the Brulhart and Usunier’s (2008, 2012) point is not definitive.

As Cox (2004) delivers sufficient conditions, our paper aims to enforce his approach by considering the following two extensions:

a) we introduce the strategy method (SM) in addition to the direct-response method (DM) to collect more information about the trustees’ actions;

b) we collect information about participants’ expectations to test their coherence with the indications derived from the triadic design.

Our motivations are explained more in details in the rest of this section.

Among others, noise can be a possible explanation for the mixed empirical evidence from the triadic design—at least for reciprocity. The trustee should decide how much to send back to the investor given the offer he received (initial conditions). Then reciprocity can be found by comparing his action to the choice of a dictator derived from a counterfactual situation, i.e. a dictator game with the same initial condition (inequality degree). Noise can emerge because the initial condition is indeed endogenous.

Specifically, the initial condition is endogenous as it is determined by the investor’s choice. Therefore, in an experiment, each pair (trustee and dictator) can be associated to a different initial degree of inequality. If inequality plays a role,\(^7\) results will be strongly dependent on the degree of inequality considered among pairs. If the Cox’s experiment is replicated, different results may just depend on different initial conditions, endogenously determined by different choices of investors.

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\(^3\) As Cox (2004), by “trust” and “reciprocity” we always mean conditional trust and conditional positive reciprocity or trustworthiness.

\(^4\) Clearly in the investment game, trustees’ endowments are endogenous as they are determined by how much the investors sent.

\(^5\) As Cox (2004) and McCabe et al. (2003). See also Cox and Deck (2005, 2006) and Cox et al. (2008) for further triadic approach applications.


\(^7\) See e.g. Dawes et al. (2007), Stanca et al. (2010) and references therein.
The above problem can be overcome by following Stanca et al. (2009). A more sophisticated way to collect information about trustees’ actions is in fact to use the SM proposed by Selten (1967)—in addition to the DM used by Cox (2004). Specifically, the SM consists of asking the trustee to make conditional choices for each feasible investor’s action (i.e., each possible degree of inequality) before being informed of his actual choice. By the SM, we can then verify the existence of reciprocity by comparing the difference between the average amount sent by trustees and the average amount sent by counterfactual dictators controlling for each degree of inequality (i.e., initial conditions).

We also test the robustness of results obtained from the triadic design with the coherence of participants’ expectations—as suggested by Coricelli et al. (2006). The idea is simple: if investors are involved in a real investment, we expect that they would always send an amount lower than their expected payoff. Then trust observed in the triadic design should be associated to a positive difference between average expected payback and amount sent by the investors. By contrast, if we do not observe trust in the triadic design we should also observe that investors’ expected gains are zero to conclude that motivations are only related to altruism.

Finally, information derived from expectations can be used to further explore the investors’ and trustees’ choices. For instance, combining observations from SM, DM and expectations, we can investigate issues such as emotional bias due to the lack of fulfillment of expectations; i.e., we can test the existence of a sort of punishment (or extra-regard) when the trustee receives less (or more) than he expected.

The rest of the paper is structured as follows. Section 2 describes our experiment. Section 3 illustrates the main outcomes of our experiments, which are then discussed in detail in Section 4. Section 5 concludes.

2. The experiment design and procedures

2.1 Treatments and assumptions

Cox (2004) suggests that evidence of conditional motivations can be found by a counterfactual approach, i.e. by comparing the outcomes of an experiment where the actions of participants are expected to be driven by both conditional and unconditional motivations to those arising from counterfactual scenarios where motivations can be only unconditional. Thus, our experiment is based on three treatments (T1, T2, and T3): the first treatment is an investment game whereas T2 and T3 are two dictator games. In each of them two subjects (A and B) interact.

The treatments are described as follows.

Definition (T1). Both A (investor) and B (trustee) are endowed with 10 tokens. Subjects interact in a two stages where they can increase or decrease their initial endowments depending on their choices. In the first stage, A can transfer to B part, all or none of his endowment (i.e., from 0 to 10 tokens) to B. Any amount transferred is multiplied by 3 before being delivered to B. In the second stage, B could transfer part,
all or none of the tripled amount of tokens received from A. Payoffs are the initial endowments plus the tokens received minus those sent.

**Definition (T2).** Both A (dictator) and B are endowed with 10 tokens. The treatment only consists in one stage where A can transfer to B part, all or none of his endowment; any amount transferred is multiplied by 3 before being delivered to B.

**Definition (T3).** This is another dictator game where A is endowed by $X$ tokens and B (dictator) by 10 plus $Y=3(10−X)$ tokens. As T2, the treatment only consists in one stage where B can transfer to A part, all or none of $Y$ tokens.

According to the Cox’s triadic design, the initial endowments of the dictators in T3 will be build by the experimenter to replicate those faced by the trustees in the investment game T1 (see the next section for details). It is worth noticing that in T3, participants do not know the underlying motivations about how their initial endowments are determined.

In all treatments if agents are selfish the perfect sub-game Nash equilibrium implies that nothing is sent, the proof is trivial. Our assumptions about players’ motivations are as follows.

**Assumption 1.** We assume that if an agent is not selfish, in T1 he may be willing to transfer tokens for both conditional and unconditional motivations.

Specifically, agent A may send positive amounts because: a) he trusts that some of the tripled amount transferred will be returned (trust or conditional other-regarding preferences); b) he is motivated by altruism (unconditional other-regarding preferences).

Agent B may transfer tokens to A because: a) he may understand the A’s underlying motivation and could send a positive payback in response to a trusting behavior; b) he is motivated by altruism or inequality aversion.

**Assumption 2.** We assume that if a player is not selfish, in T2 or T3 he will transfer tokens only because of unconditional motivations.

In T2 agent A cannot have positive expectations about feasible payback of agent B, because B does not have the opportunity to return any tokens that he could receive, then player A cannot be motivated by trust, but only by altruism (unconditional other-regarding preferences). Similarly, as in T3 the endowment distribution is independent of the A’s choices; B cannot be motivated by a trustworthiness behavior, but only by altruism or inequality aversion.

The choice of B is collected by using both strategy (SM) and decision method (DM). During the experiment, B has to make:

a) a conditional choice, for each feasible action of A, before being informed about the actual choice made by A (SM);

b) a choice after being informed about the A’s actual decision (DM).

At the end of the experiment, all subjects know that they will be randomly paid according the choice reported in SM or DM.

During T1, we also collect the expectations about the other subjects’ choice. Specifically, by defining $a$ and $b$ the amount sent respectively by A and B, expectations have been collected as follows. In first stage of the investment game, before make their
choice, we asked subject A to provide an expectation on agent B’s payback \( (b) \) for each feasible A’s strategy, i.e. \( E_A(b|a) \). At the beginning of stage two, we asked B’s expectation about A choice, i.e. \( E_B(a) \).

In order to incentive participants to reveal their expectations we use a payment scheme as Coricelli et al. (2006). In particular, we elicited subject’s expectations by using a fixed fee for each expectation that is ex post corrected.\(^9\)

Summarizing the timing for T1 is described as follows.

1) We ask A’s expectation about B’s action conditional to each A’s feasible choice: \( E_A(b|a) \);
2) A choice is done: \( a \);
3) B’s expectation about A choice is asked: \( E_B(a) \);
4) B’s conditional choice to the A’ unknown action: \( b|a \) (SM);
5) The A’s action is reveal, then B’s choice is asked: \( b \) (DM).

2.2 Hypotheses: Trust, reciprocity, altruism and expectations

According to Cox (2004), by Assumption 1 and 2, evidence for trust can be found by comparing average amount sent T1 and T2 by agents A. Formally, we test (H1) if the average amount sent by agents A in T1 is greater than T2:

\[
H1: \text{Trust} \quad a_{T1} - a_{T2} > 0
\]

where the subscript indicates the treatment and \( a \) of \( b \) (later used) the amount sent by A or B, respectively.

Similarly, in order to find evidence for reciprocity we compare the outcome sent by agents B in T1 to those sent in T3 on average. Formally, we test (H2) if the average payback actually sent in T1 by agents B is greater than in T3:

\[
H2: \text{Reciprocity} \quad b_{T1} - b_{T3} > 0
\]

We test reciprocity twice, by using information collected from the actual choice of B after \( a \) is reveled (DM) and by using conditional choice before the actual choice is reveled (SM).

As discussed above, we extend the triadic design for reciprocity, assuming that observation from DM can be biased by noise, we collect data from SM to control for each degree of inequality, i.e. for each initial inequality degree \( (\Omega) \), in comparing average amounts sent in T1 and T3 by players B. Formally,

\[
H3: \text{Reciprocity (SM)} \quad b_{T1|\Omega} - b_{T3|\Omega} > 0
\]

where the initial inequality degree is just measured by the token endowed by A, \( \Omega \in [0,10] \); tokens of B are simply \( 10+3(10-\Omega) \).

\(^9\) Experimental evidence in eliciting subjects’ expectations or beliefs show that effort and accuracy in the presence of a flat fee are comparable with the results obtained by implementing the quadratic scoring rule (Sonnemans and Offerman, 2001). See Bardsley et al. (2010) for a more detailed discussion about expectation elicitation.
Following, Coricelli et al. (2006), who point out that expectations may be important to understand trust, we assume that if the investor expects to receive a payback greater than his offer, one could say that he is motivated by trust. Formally, we test

\[ H4: \text{Trust test check } E_A(b) > a \text{ (for each feasible strategy)} \]

We expect that if H1 is accepted, H4 is, too. By contrast, if \( E_A(b) \leq a \), one can say that the investor is only motivated by altruist reasons and we expect to observe that H1 is not accepted.\(^{10}\)

Although little difference is generally reported by using DM and SM,\(^{11}\) Brandts and Charness (2011) show that some differences may emerge when emotions are taken into account, e.g. in games involving punishments. Thus, by using the information on expectations, we also test the existence of a sort of emotional bias. We assume that mismatch of expectations and actions can generate different reactions. Specifically, if the trustee receives from the investor a greater amount than he expected (i.e., \( a - E_B(a) > 0 \)), he may send an amount greater than the amount he planned to send (i.e., \( b > b|a| \)). By contrast, if the trustee receives less than he expected (i.e., \( a - E_B(a) < 0 \)), he may send an lower amount (i.e., \( b < b|a| \)). Formally,

\[ H5: \text{Emotional bias } a - E_B(a) > 0 \leftrightarrow b > b|a| \]

It is worth noticing that H5 can be also tested for only positive or negative emotional biases by separately considering the case of positive and negative mismatches.

2.2 Procedures

The experiment was conducted in May 2012 at the Experimental Lab of the University of Teramo. Participants were undergraduate students recruited by e-mail using lists of voluntary potential candidates.\(^{12}\) Subjects were randomly selected from the database. We ran two sessions for each treatment, with 30 subjects participating in each session, for a total amount of 180 participants and 6 sessions.

At the beginning of each session, subjects were required to provide identification cards; a database with name verifies that there was no repeat participation. Then all the participants were randomly divided into two groups (A and B) and placed in separate computer positions. The experiment were programmed and conducted with the software z-Tree (Fischbacher, 2007). Each subject of group A was matched to a subject of group B in a random and anonymous way and each treatment performed.

All the decisions made during the experiment were anonymous; anonymity was guaranteed by using identification codes, names remain unknown to all – including experimenter and monitors. During the experiment, two monitors checked that the instructions were correctly followed by participants. However, the monitors could not answer any questions from subjects as they had the same information (double blind procedure). Therefore, if participants had doubts, they could only read the instructions again. Participants were not allowed to talk each other during the entire experiment. At the end of the experiment, all participants were paid showing their codes.

\(^{10}\) However, recall that the triadic design provides sufficient but not necessary conditions for trust or reciprocity.

\(^{11}\) The use of DM and SM is surveyed by Bardsley et al. (2010) and Brandts and Charness (2011).

\(^{12}\) Lists were compiled in advance by using University mailing lists and advertisements placed on the University notice boards.
3. Results

Table 1 displays average amounts sent in investment and dictator games to test net trust (H1) and reciprocity (H2) according to Cox’s approach. In the first row we show the average amount sent by A subjects, which are 3.50 tokens in investment game against the 2.73 in dictator game. In the second row we show that the average amount sent by B subjects is 4.10 tokens (DM is used) in investment game, against the 3.98 tokens in dictator game.

Table 1 – Parametric and nonparametric tests of first-and second-mover data (DM)

<table>
<thead>
<tr>
<th></th>
<th>Investment Game</th>
<th>Dictator Games</th>
<th>Net</th>
<th>Mean tests</th>
<th>Wilconox</th>
<th>Wilconox</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 (Trust)</td>
<td>3.50</td>
<td>2.73</td>
<td>0.77</td>
<td>1.27</td>
<td>1.94</td>
<td>{0.10}</td>
</tr>
<tr>
<td></td>
<td>[2.19]</td>
<td>[2.46]</td>
<td></td>
<td>{0.10}</td>
<td>{0.03}</td>
<td></td>
</tr>
<tr>
<td>H2 (Reciprocity)</td>
<td>4.10</td>
<td>3.98</td>
<td>0.12</td>
<td>0.14</td>
<td>-0.44</td>
<td>{0.44}</td>
</tr>
<tr>
<td></td>
<td>[3.87]</td>
<td>[2.62]</td>
<td></td>
<td>{0.44}</td>
<td>{0.33}</td>
<td></td>
</tr>
</tbody>
</table>

Observed net trust is small (only 0.77 tokens), but statistically different from zero—as shown by the t-test on the mean and the non-parametric Wilconox test. Net reciprocity is also small (0.12 tokens), but it is not statistically different from zero.

As a result, H1 have not to be rejected, and therefore, although in small quantitative, we observe net trust, i.e., conditional other-regarding preferences seem to emerge in the game. By contrast, regarding reciprocity, H2 has to be rejected, and therefore, we do not observe net reciprocity, i.e., conditional other-regarding preferences do not seem to play any role—according to Cox’s approach.

By using information from SM (planned choice conditional to the actual choice of A) instead of the DM (actual choice) we obtain the same result as above, i.e. reciprocity does not matter. Computed by the SM, the average amount sent by B players is 5.03 tokens, which is not statistically different from 3.98 sent by the dictators in T3. See Table 2.14

Table 2 – Parametric and nonparametric tests of first-and second-mover data (SM)

<table>
<thead>
<tr>
<th></th>
<th>bT|a</th>
<th>bT|a</th>
<th>Reciprocity</th>
<th>Mean tests</th>
<th>Wilconox</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2:</td>
<td>5.03</td>
<td>3.98</td>
<td>1.05</td>
<td>1.17</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>[4.16]</td>
<td>[2.62]</td>
<td>{0.12}</td>
<td>{0.22}</td>
<td></td>
</tr>
</tbody>
</table>

Our results display a sort of puzzle. Following Cox’s approach, we find a mixed evidence for conditional other-regarding preferences, evidence for senders (subjects A), but not for responders (subjects B).

13 The last two columns report the mean and median (Wilconox) difference and one tailed p-value (between brackets) associated to a t-test and non-parametric test based on independent sample assumption, respectively.

14 It is worth noticing that there is not statistically difference between average amount sent by agents B using DM and using SM conditional to the actual choice of agents A.
As said, however, the lack of evidence in testing reciprocity may be related to the noise. Differently from DM used by Cox (2004), SM also allowed us to control for initial inequality by comparing average amounts sent by agents B in T1 and in T3 for each feasible initial distribution of tokens. We report our results in Table 3.

Table 3 – H3 Parametric and nonparametric tests of second-mover data

| Inequality (Ω) | $b_{y1}|Ω$ | $b_{y3}|Ω$ | Reciprocity | Mean tests | Wilconox$^{15}$ |
|----------------|------------|------------|-------------|------------|-----------------|
| 1              | 1,57       | 1,2        | 0,37        | 0,06       | 0,07            |
| 2              | 3,00       | 2,27       | 0,73        | 0,02       | 0,04            |
| 3              | 4,40       | 3,03       | 1,37        | 0,01       | 0,01            |
| 4              | 5,77       | 4,60       | 1,17        | 0,07       | 0,10            |
| 5              | 7,00       | 5,83       | 1,17        | 0,12       | 0,18            |
| 6              | 8,57       | 6,97       | 1,60        | 0,10       | 0,13            |
| 7              | 9,63       | 8,30       | 1,33        | 0,19       | 0,23            |
| 8              | 11,37      | 9,20       | 2,17        | 0,11       | 0,16            |
| 9              | 12,93      | 9,73       | 3,20        | 0,06       | 0,07            |
| 10             | 14,73      | 12,10      | 1,57        | 0,13       | 0,18            |

Now, for low inequality (first four rows), we find evidence for reciprocity. Large inequality instead emphasis the altruist (inequality aversion) behavior as amount sent by B in T1 and T3 are generally not statistically different. According to the Cox approach, considering averages, intentions do not matter for reciprocity (see Table 1 and 2); however, controlling for inequality we obtain a different result (Table 3). Conditional motivations matters if the inequality is low, but if inequality increase they have a second order effect and only altruism (inequality aversion) emerges.

In Table 4 we test the robustness of our results regarding trust. Following Coricelli et al. (2006), we consider the average investors’ expected gains (i.e., the difference between average expected paybacks and average amounts sent) for each feasible strategy. The results show that investors always expected a net gain from their investment. Therefore, they expect on average to be reciprocated by trustees for each amount sent.

Table 4 – H4 Trust test check

| A’s strategy: $s$ | Expected gain: $E_d(b|s)$–$s$ | H4: Statistical test ($z$) | p-value |
|-------------------|-------------------------------|---------------------------|---------|
| 1                 | 0,03                          | 0,23                      | 0,41    |
| 2                 | 0,57                          | 2,33                      | 0,01    |
| 3                 | 1,13                          | 3,01                      | 0,00    |
| 4                 | 1,50                          | 2,91                      | 0,00    |
| 5                 | 1,60                          | 2,50                      | 0,01    |
| 6                 | 1,77                          | 2,02                      | 0,02    |
| 7                 | 1,73                          | 1,80                      | 0,04    |
| 8                 | 1,77                          | 1,60                      | 0,05    |
| 9                 | 2,47                          | 1,96                      | 0,02    |
| 10                | 1,93                          | 1,28                      | 0,10    |

$^{15}$ The last two columns report the one tailed p-values associated to a mean difference t-test and median difference non-parametric test based on independent sample assumption, respectively.

$^{16}$ With the exception of the amount sent of one token where the expectations of paybacks on average are not statistically different from the amount sent.
Finally, we test the evidence for an emotional bias, i.e. different actions from those planned when participants’ expectations are not fulfilled. Our result is described in Figure 1, where we plot the ordered expectation errors \((a-E_{B}(a))\) and the corresponding difference between the actual and planned choices \((DM-SM)\). An emotional bias should imply two increasing lines as we expect the difference between DM and SM grows with the expectation error.

![Figure 1 – Emotional bias test](image)

The figure shows that mismatch of expectations does not generate any emotional bias. By looking at the data, we also do not find any correlation between the mismatched expectations and deviations from the planned choices.\(^{17}\) The result is not surprising as, indeed, subjects B obtain what they expected. In fact, expectations are not statistically different from the amount sent by subjects on average.\(^{18}\) We have also tested for positive or negative emotional biases by separately considering the case of positive and negative mismatches. The results do not change.

4. Concluding remarks

Our paper extended the triadic design proposed by Cox (2004) to separate conditional and unconditional motivations. Eliciting participants’ expectations by a fixed-fee incentive scheme and collecting data by using both direct-response and strategy method, 1) we verified the robustness of observed trust from the triadic design with participants expectations; 2) we controlled results about reciprocity for initial inequality. Specifically, by using expectations, we verified that if trust is observed, expected gains for investors are also observed. By using strategy method, we find evidence for reciprocity that is controlled for initial inequality. In fact, in the triadic design, counterfactuals used to test reciprocity depend on the inequality level that is endogenously determined in the experiment by the choices of the investors.

\(^{17}\) We find positive correlation \((0.07)\), which is however not significantly different from zero.

\(^{18}\) See the Appendix.
We find evidence for trust in the triadic design. This evidence is robust with respect to investors’ expectations. By using elicited expectations, in fact, we also find evidence of expected gains for each feasible investor’s strategy. Instead, as often occurs in these kinds of experiments, we do not find evidence for reciprocity. However, after controlling for initial inequality (by using information from strategy method), we find that conditional motivations matter for reciprocity, if the inequality is low. While if inequality increases, they have a second-order effect and only altruism (inequality aversion) is observed from the participants’ behaviors.

Finally, we test evidence for a sort of emotional bias, i.e. whenever participants take different actions from those planned when their expectations are not fulfilled. We find that the mismatch of expectations does not generate any bias. Indeed, our result is not surprising, because in our sample participants generally obtained what they have expected.

Appendix

The follow table reports actual and expected values about the amount that subjects received in T1. We report the results for subject A and B (from both DM and SM).

Table A – Parametric and nonparametric tests of first-and second mover expectations

<table>
<thead>
<tr>
<th></th>
<th>$E_A(b)$</th>
<th>$B$</th>
<th>$E_A(b) - b$</th>
<th>$t$-test</th>
<th>Wilconox ($p$-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>5,03</td>
<td>4,10</td>
<td>0,93</td>
<td>0,17</td>
<td>0,13</td>
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<td>SM</td>
<td>5,03</td>
<td>5,03</td>
<td>0,00</td>
<td>0,50</td>
<td>0,45</td>
</tr>
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<td>-1,60</td>
<td>0,18</td>
<td>0,22</td>
</tr>
<tr>
<td>9</td>
<td>11,47</td>
<td>12,93</td>
<td>-1,47</td>
<td>0,22</td>
<td>0,20</td>
</tr>
<tr>
<td>10</td>
<td>11,93</td>
<td>14,73</td>
<td>-2,80</td>
<td>0,11</td>
<td>0,12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$E_B(a)$</th>
<th>$A$</th>
<th>$E_B(a) - a$</th>
<th>$t$-test</th>
<th>Wilconox ($p$-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3,23</td>
<td>3,50</td>
<td>-0,27</td>
<td>0,28</td>
<td>0,35</td>
</tr>
</tbody>
</table>

References


Technical appendix: Experiment instructions

This appendix summarizes the instructions (translated from Italian) used in the experiment: the investment game and the two dictator games. The experiment were programmed and conducted with the software z-Tree (Fischbacher, 2007). Further details and program codes used are available upon request.

A. Investment game

A1. Subject A

<table>
<thead>
<tr>
<th>Screen 1: Welcome.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome and thank you for your participation.</td>
</tr>
<tr>
<td>From now to the end of experiment, you are kindly requested to not talk or communicate with the other participants. If you have any questions raise your hand and ask the controllers of experiment. They however have the same information that you have reading the instructions.</td>
</tr>
<tr>
<td>You are participating in an experiment that aims to study the choices of individuals. In this experiment, each subject interacts with another subject. Identities will remain anonymous. Anonymity is ensured by using code identifiers instead of names, which will remain unknown to all (including investigators and controllers). We will refer to the two individuals as subject A and subject B. Once you have entered your identification code, you will be randomly drawn as subject A or as subject B by the computer. After the draw, instructions will appear.</td>
</tr>
<tr>
<td>In the front of you there is an envelope with your identification code (a number between 1 and 200). In a few minutes you will have to enter the code. Keep the code always with you, it will be necessary for the payment at the end of the experiment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen 2: Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
</tr>
<tr>
<td>Please enter now your identification code. Control that you have insert the right code before proceeding to the draw. Once that you have insert your code you will be randomly drawn as subject A or B by the computer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen 3: The draw</th>
</tr>
</thead>
<tbody>
<tr>
<td>The drawn</td>
</tr>
<tr>
<td>You are drawn as subject A.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen 4: Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions 1/2</td>
</tr>
<tr>
<td>Read the instruction carefully. You can earn a certain amount of money depending on your choices.</td>
</tr>
<tr>
<td>Everyone (subject A and B) has an initial endowment of 10 tokens. Each token is worth 0.50 euro. The initial endowment can vary accordingly to your decisions during the experiment.</td>
</tr>
<tr>
<td>The experiment is divided into two stages:</td>
</tr>
<tr>
<td>First stage. Subject A can send to B all, part or none of the 10 tokens of his/her endowment. Subject B will receive a number of tokens equal to the amount sent by A, multiplied by three. For example, if subject A sends 2 tokens, he has 8 tokens left (10-2), whereas subject B will receive 6 tokens (2x3) that will be added to his/her endowment of 10 tokens.</td>
</tr>
<tr>
<td>Second stage. Subject B can send back tokens to A. He/she can send a number of tokens between zero and all the tokens he/she received from A, but not his/her initial endowment. E.g., if subject A sends 2 tokens, subject B may send back from 0 to 6 tokens.</td>
</tr>
</tbody>
</table>
We will ask subject B how many tokens he/she would send twice: before and after being informed about the actual choice of A.

- First, we will ask B to declare how many tokens he/she is going to send back for each feasible choice of A (which he/she does not know). In other words, we will ask B “if subject A sends you 3 tokens; how many you would send him back?,” “If subject A sends you 6 tokens; how many you would send him back?,” and so on.

- Second, the subject B will be informed of how many tokens A has actually sent, and then subject B will be asked to indicate how many tokens he/she would send back.

For the calculation of the final payments, we will use one between the amounts that subject B would send before or after knowing the actual choice of A, randomly selected by the computer.

Screen 5: Instructions

Instructions 2/2

Summarizing.

Your payoff will be equal to your initial endowment (10), less that you send to B, more that subject B will send back to you according to the choice method drawn by the computer.

Regarding the subject B, his/her payoff will be equal to his initial endowment (10), plus that subject A sends multiplied by three, less that subject B sends back according to the choice method drawn by the computer.

Remember that each tokens earned has the value of 0.50 euro!

Expectation

During the game should be asked your expectation about the other’s behavior. The answer that you give us about the other’s decision does not influence the final payoff. However, if you reach the right expectation about the other’s decision you will gain an extra token for each correct answer.

Start the experiment or turn back to read the instruction again.

Screen 8: Expectations and decisions

Questions about expectations

Your endowment is equal to the initial endowment (10) and the amount that you can send to subject B is an amount between zero and ten tokens.

Your payoff will be equal to the initial endowment (10), less that you send to subject B, more that subject B will send back in the mode of choice raffled off by computer randomly.

The payoff of subject B will be equal to the his initial endowment (10), plus that subject A sends multiplied by three, less that subject B sends back according to the mode of choice raffled by computer randomly.

Remember that the answers that you give us about the other’s decision do not influence the final payoff. However, if you reach the right expectation about the other’s decision you will gain an extra token for each correct answer.

- If you send to subject B one token, how many tokens do you expect the subject B give you back (0-3)? Insert you expectation.

- If you send to subject B two tokens, how many tokens do you expect the subject B give you back (0-6)? Insert you expectation.

- If you send to subject B three tokens, how many tokens do you expect the subject B give you back (0-9)? Insert you expectation.

- If you send to subject B four tokens, how many tokens do you expect the subject B give you back (0-12)? Insert you expectation.
- If you send to subject B five tokens, how many tokens do you expect the subject B give you back (0-15)? Insert you expectation.
- If you send to subject B six tokens, how many tokens do you expect the subject B give you back (0-18)? Insert you expectation.
- If you send to subject B seven tokens, how many tokens do you expect the subject B give you back (0-21)? Insert you expectation.
- If you send to subject B eight tokens, how many tokens do you expect the subject B give you back (0-24)? Insert you expectation.
- If you send to subject B nine tokens, how many tokens do you expect the subject B give you back (0-27)? Insert you expectation.
- If you send to subject B ten tokens, how many tokens do you expect the subject B give you back (0-30)? Insert you expectation.

Make your choice now!

Now you have to indicate the amount of tokens that you would like to send to B.

How many tokens would you send to subject B? Insert your choice.

Screen 11: Final payment

Finally, we show the payoff and extra gain obtained by guessing the right expectations by subjects A and B. We show both methods of calculation and the payoff drawn.

A2. Subject B

Screen 1: Welcome.
As above.
Screen 2: Identification
As above.
Screen 3: The draw

The drawn
You are drawn as subject B.

Screen 4: Instructions
As above.
Screen 6: Instructions

Instructions 2/2
Summarizing.
Your payoff will be equal to your initial endowment (10), plus that subject A sends multiplied by three, less that you send back according to the choice method drawn by the computer.
Regarding subject A, his/her payoff will be equal to his/her initial endowment (10), less that he/she sends to subject B, more that subject B will send back according to the choice method drawn by the computer.
Remember that each tokens earned has the value of 0.50 euro!

Expectation
During the game should be asked your expectation about the other’s behavior. The answer that you give us about the other’s decision does not influence the final payoff. However, if you reach the right expectation about the other’s decision you will gain an extra token for each correct answer.
Start the experiment or turn back to read the instruction again.

Screen 8: Begin

You have to indicate your guess about the amount that subject A would send you.
Remember that your guesses about the other’s decision does not influence the final payoff. However, if you expectation is right you will gain an extra token.

How many tokens do you expect that subject A would send you? Insert your guess.

In the next two screens, we will ask you to declare how many tokens you would to send back to A before and after being informed about his/her actual choice. Remember that you will be paid according to one of the two above decisions according to a computer drawn.

Screen 9: Decision (strategy method)

**Decision 1/2**

Your decision is taken before to being informed about the actual choice of subject A.

Your payoff will be equal to the initial endowment (10), plus that subject A sends multiplied by three, less that you send back to subject A.

Payoff of subject A will be equal to the initial endowment (10), less that he o she sends to you, more that you will send back to subject A.

You should declare, for each feasible amount of tokens sent by A, the amount of tokens that you would send back to A.

- If subject A sent you one token, how many tokens would you send back to subject A? (0-3) insert your decision
- If subject A sent you two tokens, how many tokens would you send back to subject A? (0-6) insert your decision
- If subject A sent you three tokens, how many tokens would you send back to subject A? (0-9) insert your decision
- If subject A sent you four tokens, how many tokens would you send back to subject A? (0-12) insert your decision
- If subject A sent you five tokens, how many tokens would you send back to subject A? (0-15) insert your decision
- If subject A sent you six tokens, how many tokens would you send back to subject A? (0-18) insert your decision
- If subject A sent you seven tokens, how many tokens would you send back to subject A? (0-21) insert your decision
- If subject A sent you eight tokens, how many tokens would you send back to subject A? (0-24) insert your decision
- If subject A sent you nine tokens, how many tokens would you send back to subject A? (0-27) insert your decision
- If subject A sent you ten tokens, how many tokens would you send back to subject A? (0-30) insert your decision

Screen 10: Decision (decision method)

**Decision 2/2**

The choice is taken after being informed about the actual choice of subject A.

Your payoff will be equal to your initial endowment (10), plus that subject A sends multiplied by three, less that you send back to A.
Payoff of subject A will be equal to the initial endowment (10), less he/she sends to you, more that you will send back to A.

The computer reports:
- The amount that subject A sends to him/her;
- Your endowment (plus your initial endowment of 10 tokens);
- The amount that you could send to subject A is between zero and amount received by him/her.

How many tokens would you send to subject A? insert your choice.

Screen 11: Final payment
As above.

B. Dictator game T2

Screen 1: Welcome.
As above.

Screen 2: Identification
As above.

Screen 3: The draw

The drawn
You are drawn as subject A.

Screen 4: Instructions

Instructions
Now you have to read the instructions carefully, you can earn a certain amount of money depending on the choices you make.

Everyone (subject A and subject B) has an initial endowment of 10 tokens. Each token is worth 0.50 euro. This initial allocation could be varying depending on the decisions to be taken during the experiment.

Your payoff will be equal to the initial endowment (10), less that you send to subject B.

The payoff of subject B will be equal to his initial endowment (10), plus the amount that you send to him/her multiplied by three.

For example, if subject A sends 2 tokens, he has 8 tokens (10-2), while subject B will receive 6 tokens (2x3) that add to his/her endowment 10 tokens.

For example, if subject A sends 4 tokens, he has 6 tokens (10-4), while subject B will receive 12 tokens (4x3) that add to his/her endowment 10 tokens. And so on.

Screen 5: (dictator only)
Remember that your endowment is 10 tokens and the amount that you can send to subject B is between 0 and 10 tokens.

Your payoff will be equal to the initial endowment (10), less that you send to subject B.

The payoff of subject B will be equal to his initial endowment (10), plus the amount that you send to him/her multiplied by three.

Now make your choice! You must choose the amount of tokens to send to B. Insert your choice.

Screen 6: Final payment
The payoff of A and B are displayed.
C. Dictator game T3

Screen 1: Welcome.
As above.

Screen 2: Identification
As above.

Screen 3: The draw

The drawn
You are drawn as subject B.

Screen 4: Instructions

Instructions
Now you have to read the instructions carefully, you can earn a certain amount of money depending on the choices you make. The experiment studies the choices of individuals. Every subject A has an initial endowment of 0 (zero) tokens, while each subject B has an initial endowment of 10 tokens. Each token is worth 0.50 euro. These endowments may vary depending on the decisions you make during the experiment.

The experimenter sends A and B a certain amount of additional tokens respect their initial endowments. Subject B has to decide how many tokens of his additional tokens send to subject A. Subject B can send a number of tokens between zero and all the tokens it receives from the experimenter, but not his/her initial allocation.

The payoff of subject A will be equal to the tokens received by the experimenter, more that subject B sends to him/her.

The payoff of subject B will be equal to his/her initial endowment (10 tokens), more the tokens that he or she get by the experimenter, less the tokens that you send to subject A.

We will ask to subject B to declare how many tokens he or she intends to send in 10 different situations that depend on the amounts sent by the experimenter.

The calculation of actual payment of subject A and B is selected randomly by computer from the payoff corresponding to one of the 10 situations considered.

E.g., In the first situation, the experimenter sends 9 tokens to subject A and 3 tokens to subject B. Subject B can send to subject A from 0 to 3 tokens. If you send 1 token, his/her payoff will be equal to 10 (endowment)+3−1 = 12 tokens. The payoff of subject A will instead be equal to 9 + 1 = 10 tokens.

In the second situation, the experimenter sends 8 tokens to subject A and 6 tokens to subject B. Subject B can send to subject A from 0 to 6 tokens. If you send 3 token, his/her payoff will be equal to 10 (endowment) + 6 - 3 = 13 tokens. The payoff of subject A will instead be equal to 8 + 3 = 11 tokens. And so on to other eight situations.

Screen 5: (dictator only)

Remember that your payoff will be equal to your initial endowment (10 tokens), more the tokens that you get by the experimenter, less the tokens that you send to subject A.

The payoff of subject A will be equal to the tokens received by the investigator, more that you send to him/her.

Remember also that the calculation of actual payment of subject A and B is selected randomly by the computer from the payoff corresponding to one of the 10 situations considered.

- Situation 1: If the experimenter sends you 3 additional tokens and 9 additional tokens to subject A, how many tokens would you send to subject A (0-3)? Insert the value
- Situation 2: If the experimenter sends you 6 additional tokens and 8 additional tokens to subject A, how many tokens would you send to subject A (0-6)? Insert the value
<table>
<thead>
<tr>
<th>Situation 3: If the experimenter sends you 9 additional tokens and 7 additional tokens to subject A, how many tokens would you send to subject A (0-9)? Insert the value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation 4: If the experimenter sends you 12 additional tokens and 6 additional tokens to subject A, how many tokens would you send to subject A (0-12)? Insert the value</td>
</tr>
<tr>
<td>Situation 5: If the experimenter sends you 15 additional tokens and 5 additional tokens to subject A, how many tokens would you send to subject A (0-15)? Insert the value</td>
</tr>
<tr>
<td>Situation 6: If the experimenter sends you 18 additional tokens and 4 additional tokens to subject A, how many tokens would you send to subject A (0-18)? Insert the value</td>
</tr>
<tr>
<td>Situation 7: If the experimenter sends you 21 additional tokens and 3 additional tokens to subject A, how many tokens would you send to subject A (0-21)? Insert the value</td>
</tr>
<tr>
<td>Situation 8: If the experimenter sends you 24 additional tokens and 2 additional tokens to subject A, how many tokens would you send to subject A (0-24)? Insert the value</td>
</tr>
<tr>
<td>Situation 9: If the experimenter sends you 27 additional tokens and 1 additional tokens to subject A, how many tokens would you send to subject A (0-27)? Insert the value</td>
</tr>
<tr>
<td>Situation 10: If the experimenter sends you 30 additional tokens and 0 additional tokens to subject A, how many tokens would you send to subject A (0-30)? Insert the value</td>
</tr>
</tbody>
</table>

**Screen 6: Final payment**

The payoff of A and B are displayed.