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The Sources of Happiness: Evidence from the Investment Game

Working papers

The Sources of Happiness: Evidence from the Investment Game

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Abstract

The present paper draws on data collected in an investment game plus a questionnaire to investigate whether happiness is affected by circumstances and/or outcomes of the game and to evaluate which motivations or preference structures (self-interested preferences, inequity aversion, altruism, warm glow, social-welfare preferences, trust or reciprocity) may explain such effect. Our result shows that the amount sent has significant and positive effect on trustors' self-declared happiness. We interpret this finding by arguing that the happiness effect can be explained by the enactment of the "generating" (social welfare enhancing) power of the trustor's decision. Characteristics of the investment game are such that the trustor has a value creating while the trustee only a redistributive power. This difference may explain why only trustors and not trustees are significantly and positively affected by their giving decision.

Keywords: Happiness; Investment Game; Social-welfare Preferences.
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1. Introduction

The investment game has been widely used by experimental economists to test the central economic assumption that agents are motivated by the pursue of their own self-interest.[1] According to the design proposed by Berg Dickhaut and McCabe (1995) the investment game is played by two subjects (the "trustor" and the "trustee") who are both endowed with $10. The trustor must decide how much of her endowment to send to the trustee. The experimenter triples the amount sent and the resulting sum is delivered to the trustee. The trustee (the second mover) must decide how much of the amount received (if positive) to send back to the first mover.

In their 1995 experiment, Berg et al. showed that theoretical assumptions based on self-regarding preferences fails to predict agents' behavior:

a) only 2 of 32 trustors in the no-history treatment sent zero ($5.16 was the average amount sent);
b) 11 of 30 trustees who received a positive amount of money returned more than their counterpart sent.

Moreover, when results from this experiment were provided to subjects involved in a subsequent treatment (the "social history" treatment), the average amount sent by trustors increased ($5.36) and the correlation between the amount sent and the payback becomes significant. Berg et al. interpreted their data by highlighting the role of trust in relation to the trustors and the role of reciprocity with respect to the trustees.

Cox (2004) pointed out that the described investment game design does not allow discriminating "between actions motivated by trust or reciprocity and actions motivated by other-regarding preferences characterized by altruism or inequality aversion that is not conditional on the behavior of others." Cox (2004, p.262). Cox (2004) implemented a triadic experimental design involving the investment game and two dictator games which give a first or "second mover" the same possible choices as in the original game but remove the possible effects of the (observed or anticipated) actions of the other player. This design provides evidence of the role of both altruistic or inequality-averse other-regarding preferences and trust (with respect to trustors) or reciprocity (with respect to trustees).[2]

[1] See for example Berg Dickhaut and McCabe (1995), Camerer (2003), Dufwenberg, Gneezy, Güth, and van Damme (2001), Fershtman and Gneezy (2001), Cox (2004), Ben-Ner and Putterman (2009) among others.

[2] Cox and Deck (2005) used a triadic design, consisting of the trust game and two dictator control games, to investigate the role of trust and positive reciprocity in the trust game which is a generally studied truncation of the investment game. They found that first movers' behavior was characterized by significant trust in positive reciprocity, while positive reciprocity of

The novelty of the present paper is in studying with an investment game (Berg et al. 1995) if payoffs of players and/or their behavior in the game - referable to self-interested preferences, altruistic or inequality-averse (Fehr and Schmidt 1999) other-regarding preferences (Cox 2004), social-welfare preferences (Charness and Rabin 2002), warm glow (Andreoni 1989 and 1990) and trust (on the part of trustors) or reciprocity (on the part of trustees) - affect their self-declared happiness.

Happiness is measured through questionnaires randomly filled in by players alternatively: a) after the game was ended and payoffs made known or b) before players even know the rules of the game so that the happiness declarations can not be affected by the decisions taken in the game. Such choice allowed us to tackle the problem of reverse causality, a crucial issue in happiness studies.[3]

Even though questionnaires are commonly used in experimental economics and happiness questions have been increasingly considered in economic analyses[4] (see the surveys by Frey and Stutzer, 2002a and 2002b and Clark et al., 2006), only a few studies related data collected from experimental games and happiness declarations. By using simple binary decisions and self-reported happiness, Charness and Grosskopf (2001) showed that players who choose to assign the other person lower payoffs than their own are subsequently less happy. By studying a two player power-to-take game, Bosman and van Winden (2002) find that responders' self-reported happiness measured after the game is negatively related to the take rate. Konow and Earley (2008) found that higher psychological wellbeing is associated with both higher overall happiness (mainly measured before the experiment) and more generous giving in dictator games.

Within this field of the literature the originality of the present paper is twofold. To the best of our knowledge, it is the first attempt to combine data from investment game and happiness questions. It allowed us to stress the effect of "social-welfare" preferences, which has not been previously considered in the investment game literature, on the decision of trustor to contribute in the game. With social-welfare preferences we mean the preference for maximizing the total payoff of the game. Second, our design specifically tackles the issue of causality by comparing the answers to the same happiness question given by players alternatively before or after the experiment.

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second movers only emerges when double-blind payoff protocol is not implemented. It provides evidence of a significant effect of social distance on reciprocating behavior in trust game.

[3] Almost all the relationships between happiness and its determinants may be affected by a problem of reverse causality. Are married people happier or are happier people more likely to get married? (Frey and Stutzer 2006). The same doubt concerns, for example, the relation between happiness and unemployment (Clark and Oswald 1994) or happiness and health (Graham, Eggers and Sukhtankar 2004).

[4] Most of this literature admits that interpersonal comparisons of utility are sound and interpretable by arguing that individuals are able to recognize or predict self declared happiness of others (Ferrer-i-Carbonell, 2005; Diener et al. 1999) and respondents translate verbal labels more or less into the same numerical values (Van Praag, 1991).

The analysis shows that no strategies or outcomes related to trustees are correlated with their happiness declarations. By contrast, we show that trustors' contribution (and, consequently, the total payoff generated in the game which positively depends on the amount sent by the trustor) has a significant and positive effect on their self-declared happiness. This effect arises only when questionnaires are filled in after the game, while there is no correlation when questionnaires are filled in before the game.[5] Data analysis on trustors shows that neither self-interest (the amount sent is negatively correlated with trustors' payoffs) nor inequity aversion (Fehr and Schmidt 1999) may explain the correlation between the amount sent and the happiness declaration. By comparing data on trustors and trustees we also tend to rule out explanations related to altruism[6] or warm glow (Andreoni 1989 and 1990). On the contrary, we find evidence of the importance of social-welfare preferences (see for example Charness and Rabin 2002). Given the structure of the investment game, trustors have a value creating power while trustees only redistributive. The amount sent by trustors is tripled by the experiment and it is the only way to increase the total game's payoff. Our empirical analysis shows that the act of sending and, consequently, the creation of social value by enlarging the total game payoff, affect trustors' happiness. It seems to highlights a new motivation to act which may explain agents' decisions in the investment game and, more in general, in situations where individuals may act in order to generate social value even though it implies a personal risk.

Section 2 presents our happiness question and discusses it in relation with the existing literature on happiness measurement. Section 3 describes the experimental design and the procedure implemented for our experiment. Section 4 illustrates and comments descriptive and econometric results. Section 5 concludes.

[5] Our results do not contradict some famous intuitions on the importance of caring for others for personal happiness by Adam Smith ("Concern for our own happiness recommends to us the virtue of prudence: concern for that of other people"; Smith, 1759: 385) and J. S. Mill ("Those only are happy, I thought, who have their minds fixed on some object other than their own happiness, on the happiness of others, on the improvement of mankind, even on some art or pursuit, followed not as a means, but as itself an ideal end. Aiming thus at something else, they find happiness by the way"; Mill, 1893: 117).

[6] Utility of altruistic persons increases with the well being of other agents i.e., a person is altruistic if the first partial derivatives of $U(x_1,...,x_N)$ with regard to $x_1,...,x_N$ are strictly positive (Fehr and Schmidt 2000).

2. Reliability of Happiness Questions and our Work in the Happiness Literature

The happiness question used in the survey filled in by subjects involved in our investment game asks: "Taken all together, would you say that you are: from 1 (completely unhappy) to 10 (completely happy)".[7]

In spite of their extended use, an important issue related to questions on overall happiness, along the lines of the one used in our survey, seems not to have been definitively settled. Do they correctly measure people's overall happiness and how much are they distorted from more recent events? To tackle this issue Kahneman and Krueger (2006) make a distinction between *experienced utility* and *remembered utility*, that is, between "the way people feel about experiences in real-time and the way they remember their experiences after they are over" (Kahneman and Krueger 2006, p.5). Several experimental results have shown that retrospective evaluations of past experiences are subject to systematic biases with respect to real-time reports (Kahneman, Fredrickson, Schreiber and Redelmeier 1993; Redelmeier and Kahneman 1996). The authors explain their findings by arguing that remembered utility may be a sort of weighted average in which the weights of moment utilities are not equal and more importance tend to be attributed to the end of period experiences.[8] The role of most recent experiences in self declared life satisfaction is confirmed by lab experiments. After having invited subjects in a lab, Schwarz (1987) asked them to copy a paper before filling in a questionnaire. In doing the preliminary task, a randomly chosen half of the sample found a dime deliberately put on the copy machine. Life satisfaction of subjects who found the coin resulted positively affected by this experience. Moreover, Schwarz and Clore (1983) show that subjects' answers may also be influenced by the current weather.[9] These considerations warn us about the reliability of survey questions when measuring people's happiness or life satisfaction, since such questions tend to be strongly affected by contingent situations.

In the present paper we show supporting evidence that recent experiences may significantly affect declarations on overall happiness. On the basis of this literature, we interpret the effect on

[7] Very similar happiness questions are, for example, the ones used in the World Values Surveys (WVS): "Taking all things together, would you say you are very happy, rather happy, not very happy, not at all happy?" and in the General Social Survey (GSS): "Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy".

[8] Empirical findings often show that more weight is also associated to the experience peaks. For example, with regard to a bad experience, the intensity of the worst moment greatly affects the remembered utility of the experience (Kahneman, Fredrickson, Schreiber and Redelmeier 1993).

[9] They also show that weather does not influence reported life satisfaction if subjects are first asked expressly about it.

trustors' happiness declarations in our experiment as the effect of a very recent (with respect to the filling in of the questionnaires) pleasure experience which affected trustors' moment utility.

3. Experimental design and procedure

Our investment game experiment involved 368 students from three different Italian Universities. The initial endowment of subjects was 10 tokens (1 token=0.50 euros). We adopted a between-subjects design since each subject participated only to one treatment. We ran 8 sessions (each with 16 subjects) at the University of Trento, 4 sessions (each with 32 subjects) at the Milano-Bicocca University and 4 sessions (2 with 32 subjects, 1 with 26 subjects and 1 with 22 subjects) at the University of Forlì. Each session lasted on average 45 minutes. Participants earned on average € 10.20 (including a show-up fee of € 3). At the University of Milano-Bicocca and at the University of Forlì subjects were recruited by email.[10] At the University of Trento they were recruited by posting ads at various departments.[11] The subjects who participated in the experiments were all students enrolled in different programs of study, even though most of them were students of Economics. In all sessions, subjects played the game and filled in the survey by using a computer. The experiment was completely anonymous. Two experimenters were in the room during the sessions and coordinated all of them.

In each session, before the subjects arrived in the room, the two experimenters associated at random the role of trustor or trustee to each computer and linked each computer with another one in the room. When subjects arrived in the room, they picked a slip of paper with an alphanumerical identification code from a box and chose one of the computers at random. By choosing a computer, players automatically and at random decided their role (trustor or trustee) and were assigned to their counterpart. The experimenters gave subjects written instructions (instructions are available from the author upon request) which were read aloud by one of the experimenters. The subjects signed in by entering their alphanumerical identification code on their computers. Thus they discovered their role and played the game. After each trustor made her choice by deciding how many tokens to send to the trustee, a message with the tripled number of tokens sent by the trustor appeared on the monitor of the

[10] All students included in the mailing list of the Experimental Economics Laboratory (EELAB) of the University of Milano-Bicocca and in the mailing list of the Laboratory of Experimental Economics (LES) of the University of Forlì could potentially take part to the experiments. Two weeks before the experiment they received an email in which the staff invited them to visit the Laboratory's website for information about the experiment and subscriptions.

[11] Ads were posted seven days before the experiment. Subscriptions by students interested in participating to the experiment have been collected by the staff of the Computable and Experimental Economics Laboratory (CEEL) of the University of Trento.

trustee. Successively, the trustee made her choice and the game finished. Finally, the payoff of the players appeared on their monitors. Subjects were paid just after the end of the experiment.

A randomly chosen part of our sample students filled in the questionnaire after having played (218 out of 368) and the other part before playing and knowing the rules of the game (for further details about the timing of the experiment see Appendix 1).

Our experiment was also characterized by a specific treatment (the "meeting treatment") aimed at studying the effect of the reduction of social distance in an investment game (evidence on this effect and more detail on this treatment are in Becchetti et al. 2007). In fact, 186 out of our 368 subjects had the possibility to choose whether to opt for meeting their counterpart after the end of the game (the other 182 players played a standard investment game). Individuals who opted for the meeting, met their counterparts after the game, but only if their counterparts had decided to meet them as well. Decisions about the willingness to meet the other player were collected by asking subjects to fill a form with the following question: "Do you want to meet, at the end of the experiment, the person you are paired with?". They were informed of the fact that the meeting would take place only if both players replied with a "Yes". When subjects made their choices about the meeting they knew the rules of the game, but they did not know which role they were going to play and about the meeting choice of the counterpart. Subjects were informed on their opponents' choice about the meeting only at the end of the game and after the payment. If both players opted for the meeting they actually met.

In case of the meeting treatment, players who filled in questionnaires before the game did not know anything about the meeting option when they answered the questionnaires' questions. The questionnaires that were filled in after the game were answered after the decision about the meeting, but before knowing the meeting decision of the counterpart and before meeting the counterpart.[12] As we will show in the empirical analysis, the existence of the meeting option does not affect in any way our result on happiness determinants.

[12] For further details about the timing of the experiment see Appendix 1.

4. Hypotheses and Results

Hypotheses and Descriptive Findings

Ex post (with respect to the game) happiness declarations of both trustors and trustees in the investment game may be affected by:

- ✓ their own final payoffs (self-interest);
- ✓ the final payoff of the counterpart (altruism);
- ✓ the comparison between their own and the counterpart's final payoff (inequity aversion).

Ex post trustors' happiness declarations may also be affected by:

- ✓ the amount sent to the trustee (warm glow, social-welfare preferences[13]);
- ✓ the amount sent back by the trustee (trustee's reciprocity).

Ex post trustees' happiness declarations may be also affected by:

- ✓ the amount received from the trustor (trustor's trust),
- ✓ the amount returned to the trustor (warm glow).

Tables 1 and 2 display our experimental evidence on trustors and trustees with respect to the previous hypotheses.

Table 1 Determinants of ex post happiness declarations: descriptive evidence on trustors

Hypotheses on the determinants of ex post trustors' happiness	Correlation between the ex post trustor's happiness declaration and:
self-interest	the trustor's final payoff: **-0.036**
altruism	the counterpart's final payoff: **0.169***
inequity aversion	the absolute value of the difference between the trustors' payoff and the counterpart's payoff: **0.002**
warm glow, social-welfare preferences	the amount sent to the trustee: **0.198****
trustee's reciprocity	the amount paid back by the trustee on the total amount received: **0.020**

* significant at 5%; ** significant at 1%.

[13] Notice that, given the game structure, the amount sent by the trustor is perfectly correlated with the social value generated in the game, i.e. the total payoff won by the two players.

Table 2 Determinants of ex post happiness declarations: descriptive evidence on trustees

Hypotheses on the determinants of ex post trustees' happiness	Correlation between the ex post trustee's happiness declaration and:
self-interest	the trustee's final payoff: **0.027**
altruism	the counterpart's final payoff: **-0.021**
inequity aversion	the absolute value of the difference between trustee's payoff and the counterpart's payoff: **0.016**
trustor's trust	the amount received from the trustor: **0.021**
warm glow	the amount returned to the trustor: **-0.004** (the amount paid back on the total amount received: **0.049**)

* significant at 5%; ** significant at 1%.

Our results show that there is no statistically significant correlation between either trustees' happiness declarations and payoffs obtained by trustors or between trustees' decisions or payoffs and their happiness. By contrast, trustors' ex post happiness declarations are correlated with:

a) the payoff obtained by trustees;
b) the amount sent by trustors (and, consequently, the total payoff generated in the game which strictly depends on the trustor's contribution – correlation is 1).

Since the amount won by trustees and the amount sent by trustors are positively correlated (0.852, significant at 1%), it is not possible, by just considering the data on trustors, to disentangle between the effect of warm glow, altruism and social-welfare preferences on happiness. However, by looking at the evidence on trustees, the effect on trustors' happiness of altruism and warm glow may be reasonably excluded. In fact, if these motivations are capable of affecting happiness declarations, they should have also affected trustees' answers. On the contrary, the explanation related to the social-welfare preferences only applied to trustors. In fact, trustees can not act in order to increase the total payoff of the game.

Moreover, by looking at our experimental data, we may exclude that the correlation between the amount sent and the happiness declaration is due to indirect effects of self-interest and inequity aversion. Since the monetary payoff obtained by trustors is negatively correlated with the amount sent (-0.351, significant at 1%, with regard to the trustors who filled in the survey after the game), we can suppose that subjects who feel happy by contributing in the game do not obtain their happiness from reasons related to self-interest. Not even the utility theory of inequality aversion developed by Fehr and

Schmidt (1999) seems to be helpful to explain the correlation between happiness declaration and amount sent by trustors. The two-agent version of the model proposed by Fehr and Schmidt is a utility function of the form: $U_i(x) = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\}$, $i \neq j$ $\beta_i \leq \alpha_i$ $0 \leq \beta_i < 1$. According to our results, x_i decreases when the amount sent increases, and the difference between x_i and x_j increases with the amount sent by trustors (the correlation is equal to 0.829, significant at 1%, with regard to the trustors who filled in the survey after the game). For these reasons, on the basis of the payoffs won by players in our investment game, the utility got by inequity-averse trustors, and, consequently, their happiness declaration, should be lower when the amount sent increases.

In what follows, the robustness of the positive correlation between the amount sent by trustors and their ex post happiness declarations will be analyzed. This result will be interpreted as the effect on happiness due to the implementation of an act aimed at increasing the total payoff of the game.

The Issue of Causality

The average trustor contribution is 4.48 tokens (min 0; max 10; std.dev. 3.13). It does not significantly change (two-sample Wilcoxon rank-sum (Mann-Whitney) test= 1.236 Prob > |z| = 0.216) if we consider the two subsamples of trustors who filled in the survey before (mean 4.85; min 0; max 10; std.dev. 3.27) and after (mean 4.22; min 0; max 10; std.dev. 3.01) the game. This seems to indicate that there is no survey effect on the trustor's decision, that is, the amount sent by the trustor does not appear to be affected by questions included in the questionnaire.

If we consider the total sample, a significant (at 1%) and positive correlation between the amount sent by trustors and their happiness declarations (0.198) comes out. However, this correlation disappears if we consider the sub sample of trustors who filled in the survey before the game (0.079), while it remains significant at 1% if we consider the sub sample of trustors who filled in the survey after the game (0.310). Even if we have not investigated the robustness of this relation yet, what is more interesting here is that the correlation between the level of happiness declared by trustors and their contribution in the investment game seems to be the expression of a specific causality direction that goes from the latter to the former. Trustors who contribute more in the game declare, after having played, a higher level of happiness.

Econometric Findings

In order to examine the effect of the amount sent (variable named *Amount_sent*) on the happiness declaration (*Happiness*) we performed ordered logit estimates[14] in which the level of happiness is associated with the amount sent by trustors and with various controls.[15] Controls include:

- ✓ variables determined in the game, i.e. the trustors' payoff (*Trustor_payoff*), the trustees' payoff (*Trustee_payoff*), the absolute value of the difference between trustors' payoff and the counterparts' payoff (*Payoff_comparison*), the amount sent back by the trustee (*Payback*), the amount paid back on the total amount received (*Share_payback*);[16]
- ✓ socioeconomic determinants, i.e. age (*Age* and *Age_squared*), gender (*Male* - gender dummy taking the value of one if the subject is a male), income (*Income*)[17], health (*Health* - dummy variable which takes the value of 1 if subject declares to have never had health problems)[18], marriage (*Marriage* - dummy variable which takes the value of 1 if the subject is married) and ethnicity (*Ethnicity* - dummy variable which takes the value of 1 in case of Italian subjects);[19]
- ✓ the location dummies (*Trento* and *Forli*) which consider the different places where the experiments have been conducted;
- ✓ a dummy which considers if subjects participated in the treatment with the meeting option (*Meeting_option*) and a dummy (*Meeting_yes*) which distinguishes between players who opted for the meeting and players who do not (this last variable was used only in the estimations referred to the sub-sample of people who took part in the treatment with the meeting option).

Table 3 shows the regressions on players who filled in the questionnaires after the game. Equation 1 presents the estimation which includes the amount sent by the trustors, all the socioeconomic variables used as controls, the location dummies and the meeting option dummy. It

[14] Results do not significantly change by using OLS estimations.
[15] The full list of variables used and descriptive statistics are presented in Appendix 2.
[16] The total amount won by the two players has not been considered because it is perfectly correlated with the amount sent.
[17] Variable which varies between 1 and 7 according to the answer to the following question: Please consider the following income classes. Could you indicate the class of your family considering wages, pensions and all the other income concerning your family's members? Choose the class considering the net income (after taxation).
1) 0-9.999; 2) 10.000-19.999; 3) 20.000-29.999; 4) 30.000-39.999; 5) 40.000-49.999; 6) 50.000-59.999; 7) more than 60.000
[18] The dummy variable stems from the following question: "Have you ever had health problems? (It is possible to mark more than one answer): a) Less than 6 months ago; b) Between 6 months ago and 2 years ago; c) Between 2 and 4 years ago; d) More than 4 years ago; e) Never."
[19] Many socioeconomic variables have been considered as determinants of happiness (Dolana, Peasgooda, White 2007). In this paper we focus on the usual socioeconomic determinants (Graham, Eggers, Sukhtankar 2004) a part from the employment situation and education which have not been included in our regressions since our subjects are university students.

shows a positive and significant effect of the amount sent on trustors' happiness declarations. In this case, the marginal effects calculated at the mean of the *Amount_sent* variable show that the greater effect of the amount sent is on the probability of an happiness declaration equal to 9 (marginal effect is 0.039) while the marginal effect associated with an happiness declaration equal to 10 is 0.008.

INSERT TABLE 3

Equations 2-7 also consider the single variables determined in the game. The effect of the amount sent by trustors is robust to the inclusion of all these controls with the exception of the trustees' payoff. Multicollinearity (correlation between *Amount_sent* and *Trustee_payoff* is 0.900) prevents us from evaluating the relative contribution of one variable *vis à vis* that of the other. However, if trustors happiness declarations were affected by the trustees' payoffs, we should symmetrically observe an effect of trustors' payoffs on trustees' happiness declarations. Since the descriptive analysis demonstrates that it is not the case, we interpret the effect of trustees' payoffs on trustors' happiness as a spurious one, due to the high correlation with the amount sent.

Table 4 displays evidence on our robustness check. First, we decided to control our result by considering the subsamples of subjects who: 1) played in the treatment without the meeting option; 2) played in the treatment with the meeting option (in this second case, the dummy variable *Meeting_yes* which takes into account the decision of subjects on to meet or not to meet their counterpart is included). Second, given the high number of missing observations related to the income variable, we performed all the regressions reported in table 3 also without it. Table 4 only reports the coefficients of *Amount_sent* in these different checks. Complete estimates' results are available from the authors upon request.

INSERT TABLE 4

In the estimations performed on the subsample of subjects who played in the treatment without the meeting option, the amount sent always affects the happiness declaration. In one case, when the amount returned by trustees is included in the regressions, the statistically significance is at 10%. With respect to the subsample of subjects who played in the treatment with the meeting option the coefficient of *Amount_sent* is always statistically significant (at 5%), except when the payoff won by trustees is included in the regression (notice that all the estimations which include both the amount sent and the

payoff obtained by trustees are characterized by multicollinarity).[20] Finally, when we exclude from regressions the variable *Income*, we find that also when we consider 106 observations, the effect of *Amount_sent* on *Happiness* is confirmed.

Tables 5 and 6 replicate the same estimations presented in tables 3 and 4 with respect to the subjects who played after having filled in the survey. In the subsample of subjects who played with the meeting options we performed OLS regressions since convergence is not achieved in ordered logit estimations because of the small number of observations. Results from the econometric analysis confirm descriptive findings. The relationship between the amount sent and the happiness declaration holds only for subjects who answered the happiness question after having played the game.

INSERT TABLES 5 AND 6

5. Conclusions

The present paper draws on data collected in an investment game to investigate whether circumstances and/or outcomes of the game affect individuals' self-declared happiness and verifies the consistency of observed findings with various patterns of preferences such as self-interest, inequity aversion, altruism, warm glow, social-welfare preferences, trust or reciprocity. Happiness has been measured through questionnaires filled in alternatively after the experiment or before explaining the rules of the game to the players.

The descriptive analysis does not reveal any effect of the game on happiness declarations of trustees. By contrast, the amount sent by trustors and, consequently, the total payoff generated in the game, positively affects their ex post happiness declarations. Since no relationship exists between the happiness declarations and the amount sent with respect to the trustors who filled in the questionnaires before the game, we may consider that there is a specific causality direction that goes from the amount sent to happiness.

The correlation between the amount sent by trustors and their ex post happiness may not be explained by considering either self-interest (the amount sent is negatively correlated with trustors' payoffs) or inequity aversion (the payoff of trustors' decreases and the difference between trustors' and trustees' payoff increases with the amount sent). Moreover, by comparing evidence on trustors and trustees, we may rule out explanation related to warm glow and altruism.

[20] In this subsample, correlation between *Amount_sent* and *Trustee_payoff* is 0.926.

To interpret our result we observe that, given the structure of the investment game, trustors have a value creating power (the amount sent by trustors is tripled by the experiment and it is the only way to increase the total game's payoff) while trustees only redistributive. Because of that, the effect of the amount sent on trustors' happiness may be interpreted in terms of social-welfare preferences. It is the act of sending and consequently the act of enlarging the total game payoff which affects trustors' happiness. This result highlights a new motivation to act which may explain agents' decisions in the investment game.

The econometric analysis shows that the association between the amount sent and happiness is robust to the consideration of different subsamples and to the inclusion in the estimations of several control variables such as socioeconomic variables usually considered as determinants of happiness and variables related to the game.

Our findings disclose a previously unexplored aspect of investment games and stimulate further research to verify whether they can be successfully replicated. Ad hoc modified investment game experiment designs creating differences in the trustor's generating (social welfare enhancing) power may reinforce or confute the relevance of a seldom considered motivation of human action.

Table 3 The Determinants of Self Declared Happiness
(Sample of Subjects who Filled in the Survey after the Game)

Equation	**1** **Ologit**	**2** **Ologit**	**3** **Ologit**	**4** **Ologit**	**5** **Ologit**	**6** **Ologit**
	Dependent Variable: *Happiness*					
Amount_sent	0.253	0.238	0.157	0.254	0.278	0.205
	(0.088)***	(0.092)**	(0.186)	(0.088)***	(0.098)***	(0.094)**
Age	0.178	0.186	0.186	0.222	0.186	0.414
	(0.993)	(0.997)	(0.997)	(1.000)	(0.997)	(1.066)
Age_squared	-0.003	-0.003	-0.003	-0.003	-0.003	-0.007
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.022)
Male	0.361	0.365	0.365	0.345	0.365	0.441
	(0.584)	(0.585)	(0.585)	(0.584)	(0.585)	(0.619)
Income	-0.030	-0.036	-0.036	-0.028	-0.036	-0.056
	(0.174)	(0.174)	(0.174)	(0.175)	(0.174)	(0.199)
Health	1.186	1.199	1.199	1.179	1.199	1.124
	(0.532)**	(0.533)**	(0.533)**	(0.532)**	(0.533)**	(0.550)**
Marriage	1.880	1.758	1.758	1.817	1.758	1.869
	(1.159)	(1.180)	(1.180)	(1.173)	(1.180)	(1.168)
Ethnicity	-1.614	-1.607	-1.607	-1.683	-1.607	-1.536
	(1.084)	(1.087)	(1.087)	(1.097)	(1.087)	(1.100)
Trustor_payoff		-0.040				
		(0.069)				
Trustee_payoff			0.040			
			(0.069)			
Payoff_comparison				-0.008		
				(0.023)		
Payback					-0.040	
					(0.069)	
Share_payback						-0.532
						(1.106)
Trento	0.501	0.455	0.455	0.523	0.455	0.599
	(0.646)	(0.650)	(0.650)	(0.648)	(0.650)	(0.705)
Forli	1.057	1.053	1.053	1.069	1.053	1.107
	(0.654)	(0.656)	(0.656)	(0.655)	(0.656)	(0.682)
Meeting_option	-0.577	-0.575	-0.575	-0.564	-0.575	-0.760
	(0.520)	(0.523)	(0.523)	(0.521)	(0.523)	(0.568)
cut1	-1.678	-2.037	-1.231	-1.275	-1.634	1.051
	(11.664)	(11.718)	(11.729)	(11.709)	(11.703)	(12.370)
cut2	-0.931	-1.290	-0.483	-0.531	-0.886	1.813
	(11.649)	(11.703)	(11.714)	(11.692)	(11.688)	(12.357)
cut3	0.628	0.270	1.077	1.016	0.674	3.228
	(11.658)	(11.712)	(11.722)	(11.698)	(11.697)	(12.373)
cut4	1.123	0.768	1.575	1.506	1.171	3.807
	(11.660)	(11.715)	(11.726)	(11.700)	(11.700)	(12.381)
cut5	2.537	2.190	2.996	2.925	2.593	5.109
	(11.655)	(11.708)	(11.721)	(11.696)	(11.694)	(12.385)
cut6	4.396	4.042	4.848	4.794	4.445	6.921
	(11.649)	(11.701)	(11.713)	(11.693)	(11.687)	(12.384)
cut7	6.654	6.298	7.105	7.060	6.701	9.178
	(11.658)	(11.714)	(11.727)	(11.705)	(11.701)	(12.398)
Pseudo. R^2	0.115	0.117	0.117	0.116	0.117	0.107
Prob > χ^2	0.010	0.014	0.014	0.015	0.014	0.044
Number of obs.	64	64	64	64	64	60

* Significant at 10%; ** significant at 5%; *** significant at 1%; standard errors in brackets.

Table 4 The Effect of the Amount Sent on Happiness Declaration – Robustness Check (Sample of Subjects who Filled in the Survey after the Game)

	Estimations on the sub sample of players who played without the meeting option (Number of Obs. 30)	Estimations on the sub sample of players who played with the meeting option (Number of Obs. 34)	Estimations on the whole sample without the variable *Income* (Number of Obs. 106)
	Coefficient of *Amount_sent*		
Equation 1	0.415	0.364	0.236
	(0.159)***	(0.175)**	(0.068)***
Equation 2	0.456	0.347	0.188
	(0.165)***	(0.183)*	(0.072)***
Equation 3	0.725	0.261	-0.010
	(0.298)**	(0.370)	(0.147)
Equation 4	0.429	0.439	0.238
	(0.161)***	(0.183)**	(0.068)***
Equation 5	0.321	0.390	0.287
	(0.176)*	(0.194)**	(0.074)***
Equation 6	0.426	0.360	0.191
	(0.194)**	(0.178)**	(0.076)**
	(Number of obs 26)		(Number of obs 26)

Ordered logit estimations. Dependent Variable: *Happiness*. Equations 1-6 related to the sub sample of players who played without the meeting option include the same variables of the corresponding equations 1-6 reported in Table 1. Equations related to the sub sample of players who played in the treatment with the meeting option include all the variables of the corresponding equations 1-6 reported in Table 1 and the variable *Meeting_yes*. Equations 1-6 related to the whole sample of players include the same variables of the corresponding equations 1-6 reported in Table 1 except the variable *Income*. * Significant at 10%; ** significant at 5%; *** significant at 1%; standard errors in brackets.

Table 5 The Determinants of Self Declared Happiness
(Sample of Subjects who Filled in the Survey before the Game)

Equation	**1** **Ologit**	**2** **Ologit**	**3** **Ologit**	**4** **Ologit**	**5** **Ologit**	**6** **Ologit**
	Dependent Variable: *Happiness*					
Amount_sent	-0.017	-0.040	0.091	0.016	-0.106	-0.054
	(0.090)	(0.090)	(0.121)	(0.093)	(0.113)	(0.126)
Age	-0.249	-0.255	-0.255	-0.127	-0.255	-0.207
	(0.516)	(0.512)	(0.512)	(0.521)	(0.512)	(0.526)
Age_squared	0.006	0.006	0.006	0.004	0.006	0.005
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Male	0.330	0.197	0.197	0.309	0.197	0.334
	(0.556)	(0.564)	(0.564)	(0.555)	(0.564)	(0.726)
Income	0.102	0.095	0.095	0.137	0.095	0.081
	(0.153)	(0.157)	(0.157)	(0.156)	(0.157)	(0.165)
Health	1.327	1.487	1.487	1.394	1.487	1.240
	(0.584)**	(0.603)**	(0.603)**	(0.589)**	(0.603)**	(0.649)*
Marriage	0.198	-0.289	-0.289	0.093	-0.289	-0.412
	(1.723)	(1.770)	(1.770)	(1.727)	(1.770)	(1.797)
Ethnicity	-0.824	-0.806	-0.806	-0.914	-0.806	-0.591
	(1.299)	(1.321)	(1.321)	(1.335)	(1.321)	(1.319)
Trustor_payoff		0.066				
		(0.052)				
Trustee_payoff			-0.066			
			0.052			
Payoff_comparison				-0.035		
				(0.024)		
Payback					0.066	
					(0.052)	
Share_payback						1.125
						(1.012)
Trento	0.512	0.673	0.673	0.284	0.673	0.743
	(1.009)	(1.020)	(1.020)	(1.014)	(1.020)	(1.036)
Forli	1.518	1.550	1.550	1.434	1.550	1.645
	(0.653)**	(0.643)**	(0.643)**	(0.654)**	(0.643)**	(0.714)**
Meeting_option	-0.052	0.040	0.040	0.151	0.040	-0.109
	(0.633)	(0.641)	(0.641)	(0.651)	(0.641)	(0.683)
cut1	-5.968	-5.493	-6.808	-4.450	-6.150	-5.197
	(7.067)	(7.030)	(7.039)	(7.130)	(7.016)	(7.148)
cut2	-5.237	-4.743	-6.057	-3.723	-5.400	-4.443
	(7.027)	(6.990)	(6.997)	(7.090)	(6.974)	(7.105)
cut3	-4.794	-4.289	-5.603	-3.287	-4.946	-3.982
	(7.008)	(6.971)	(6.975)	(7.071)	(6.954)	(7.083)
cut4	-3.283	-2.751	-4.066	-1.783	-3.408	-2.552
	(6.994)	(6.956)	(6.957)	(7.061)	(6.937)	(7.067)
cut5	-2.082	-1.526	-2.841	-0.542	-2.183	-1.294
	(7.004)	(6.963)	(6.960)	(7.075)	(6.942)	(7.076)
cut6	-0.364	0.220	-1.095	1.288	-0.438	0.363
	(7.001)	(6.959)	(6.950)	(7.089)	(6.935)	(7.080)
cut7	2.195	2.818	1.503	3.917	2.160	2.909
	(7.001)	(6.967)	(6.951)	(7.106)	(6.939)	(7.087)
Pseudo. R^2	0.082	0.091	0.091	0.094	0.091	0.095
Prob > χ^2	0.208	0.187	0.187	0.162	0.187	0.231
Number of obs.	54	54	54	54	54	48

* Significant at 10%; ** significant at 5%; *** significant at 1%; standard errors in brackets.

Table 6 The Effect of the Amount Sent on Happiness Declaration – Robustness Check (Sample of Subjects who Filled in the Survey before the Game)

	Estimations on the sub sample of players who played without the meeting option (Number of Obs.21) OLS estimations	Estimations on the sub sample of players who played with the meeting option (Number of Obs.33) Ordered logit estimations	Estimations on the whole sample without the variable *Income* (Number of Obs. 68) Ordered logit estimations
		Coefficient of Amount_sent	
Equation 1	0.023	-0.258	0.047
	(0.127)	(0.147)*	(0.077)
Equation 2	-0.153	-0.257	0.036
	(0.149)	(0.146)*	(0.078)
Equation 3	0.217	-0233	0.124
	(0.155)	(0.206)	(0.110)
Equation 4	0.101	-0.229	0.049
	(0.147)	(0.151)	(0.080)
Equation 5	-0.338	-0.269	-0.007
	(0.225)	(0.162)*	(0.095)
Equation 6	0.325	-0.325	-0.050
	(0.374)	(0.182)*	(0.111)
	(Number of Obs.16)	(Number of Obs.32)	(Number of Obs.59)

Dependent Variable: *Happiness*. Equations 1-6 related to the sub sample of players who played without the meeting option include the same variables of the corresponding equations 1-6 reported in Table 1. Equations related to the sub sample of players who played in the treatment with the meeting option include all the variables of the corresponding equations 1-6 reported in Table 1 and the variable *Meeting_yes*. Equations 1-6 related to the whole sample of players include the same variables of the corresponding equations 1-6 reported in Table 1 except the variable *Income*. * Significant at 10%; ** significant at 5%; *** significant at 1%; standard errors in brackets.

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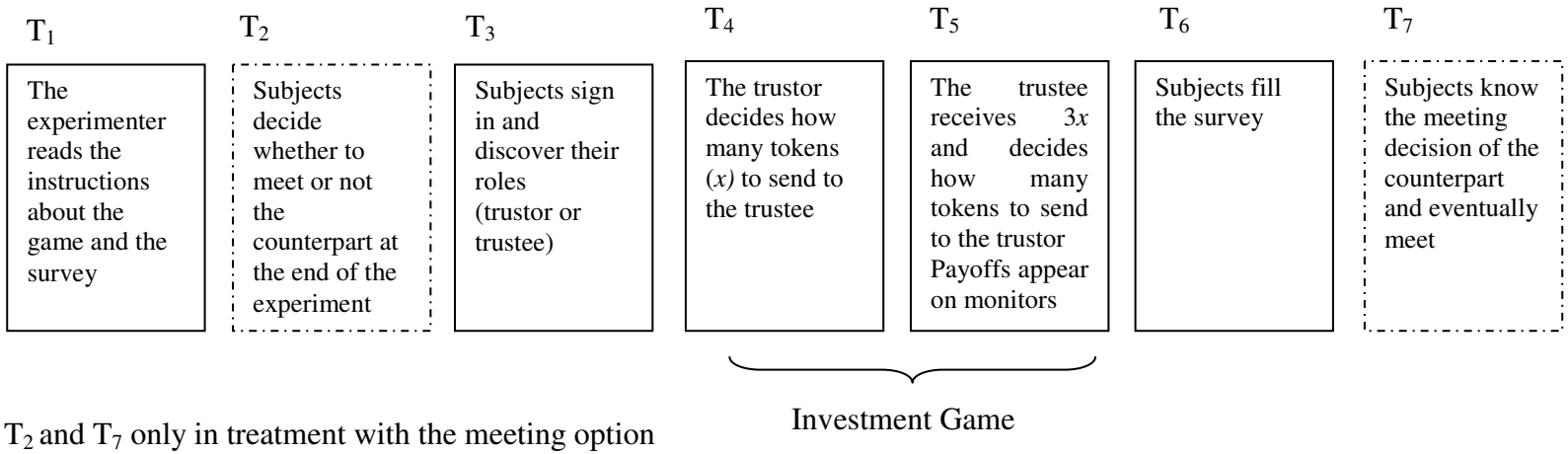
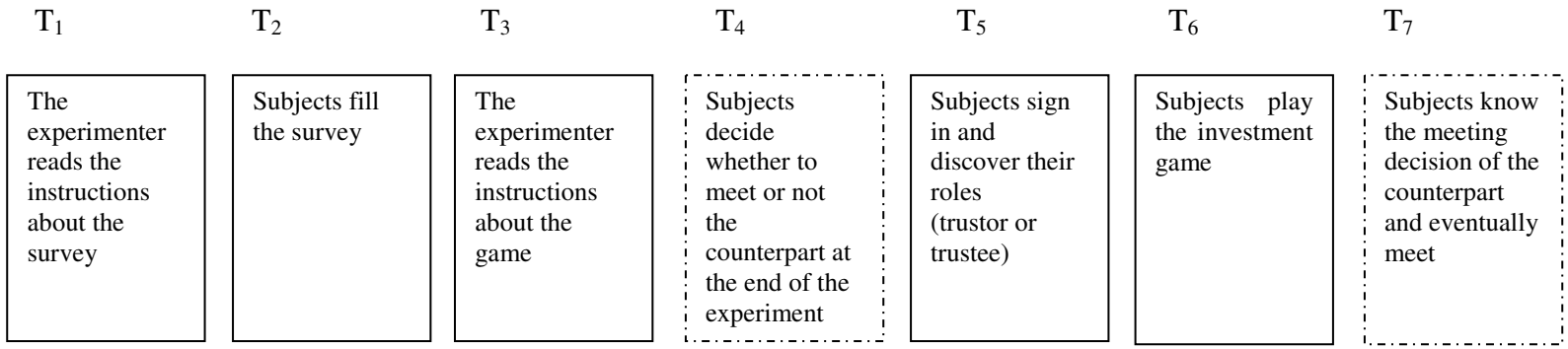
Appendix 1. Timing of the experiment

TREATMENT WITH SURVEY AFTER THE GAME



T_2 and T_7 only in treatment with the meeting option

TREATMENT WITH SURVEY BEFORE THE GAME



T_4 and T_7 only in treatment with the meeting option

Appendix 2. Descriptive statistics (sample of subjects who filled in the survey after the game)

Variable	*Obs.*	*Mean*	*Std. Deviation*	*Minimum*	**Maximum**
Amount_sent	109	4.220	3.013	0	10
Happiness	107	7.579	1.542	1	10
Trustor_payoff	109	8.505	3.800	0	26
Trustee_payoff	109	19.936	8.175	10	40
Payoff_comparison	109	11.761	10.886	0	40
Payback	109	2.725	3.934	0	24
Share_payback	97	0.234	0.230	0	1
Age	109	22.202	2.981	18	32
Age_squared	109	501.725	143.884	324	1024
Male	107	0.449	0.500	0	1
Income	65	3.846	1.593	1	7
Health	109	0.514	0.502	0	1
Marriage	109	0.550	0.229	0	1
Ethnicity	108	0.898	0.304	0	1