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Abstract

There may be a nexus between card games and financial markets. Akerlof and Shiller (2010) wonder whether the decline in the number of bridge players and the growth in the number of poker players may have led to the current bad financial traders' practices which are responsible for the global financial crisis. The reason is that bridge is a cooperative game generally played without monetary payoffs, while poker is an individualistic game with monetary payoffs. We simulate trust and dictator game experiments on a large sample of affiliated bridge and poker players. We find that bridge players make more polarized choices and send significantly more than poker players as trustors, a result which is reinforced when corrected for risk aversion and dictator giving. Overall, our findings do not reject the hypothesis that bridge practice is associated with a relatively higher disposition to team reasoning and strategic altruism.

Keywords: trust games, financial crisis, poker , bridge.
JEL numbers: **C72**- Non-cooperative Games; **C91** - Laboratory, Individual Behavior; **A13** - Relation of Economics to Social Values.

1. Introduction

Financial crises may have been partially determined by shifts in agents' behavior. A suggestive interpretation put forward by Akerlof and Shiller (2010) is that the traders' bad financial practices that led to the global crisis, may be a reflection of changes in leisure activities, notably the decline in popularity of more cooperative games like bridge together with the increased diffusion of individualistic games like poker.

These considerations bring us back to the hot debate in the literature on whether frequently practiced activities shape individual preferences, or people choose instead such activities on the basis of their preferences.[1]

Notably Akerlof and Shiller (2010) wonder whether there has been a shift in preferences caused by the sharp decline in popularity of bridge and the huge increase in the number of people playing poker. Card games, and in particular bridge and poker, have always been an issue of great curiosity, inspiration and interest for academics. Borel's (1938) and Von Neumann's analysis of bluffing in poker (Von Neumann and Morgenstern, 1944), for example, contributed to the foundations of the information and game theory. Borel's model of poker (called "la relance") finds the optimal strategies of a player (including bluff), differentiating the cases of plain game and pot-limit poker[2]. Bridge has elicited similar interest among academics and has greatly contributed to the development of probability theory[3] even though, due to its complexity, it still poses a great challenge for game theorists[4].

[1] In this respect a consolidated body of empirical evidence (see among others Loewenstein and Angner, 2003; Malmendier and Nagel, 2010) has challenged the old tenet of time invariant preferences (Becker and Stigler, 1977). We refer to experimental findings from Dictator Games (Andreoni and Miller 2002), Ultimatum games (Güth, Schmittberger and Schwarze, 1982, Camerer and Thaler 1995), Gift Exchange Games (Fehr, Kirchsteiger and Reidl, 1993, Fehr, Kirchler, Weichbold and Gächter 1998), Trust Games (Berg, Dickhaut and McCabe 1995, Ben-Ner and Putterman 2006) and Public Good Games (Fischbacher, Gächter and Fehr 2001, Sonnemans, Schram and Offerman 1999, Fehr and Gächter 2000). There is a lively debate on whether experimental results from behavioural economics should be interpreted as evidence of agents' preferences or as the outcome of social norms (Binmore 2010, Binmore and Shaked, 2010, Fehr and Schmidt, 2007, 2010). A debated issue in the literature is also whether frequently practiced activities can shape individual preferences.

[2] Von Neumann finds new implications just limiting losses for players. A further extension of the Borel's model is given by the work of Bellman and Blackwell (1949), Bellman (1952) and Karlin and Restrepo (1957).

[3] Borel and Cheron (1940) explain how bridge has greatly helped in understanding the practical implications of probabilistic laws and theorems trough the analysis of hand distributions and the design of playing strategies. A new statistical method for evaluating bridge hands has been proposed by Cowan (1987).

[4] There is no comparable literature on game theory models of bridge. To our knowledge there are only Binmore's suggestions of classifying bridge either as a game of imperfect information and perfect recall or as a two players, zero-sum game, in which case it would be a game of imperfect recall (Binmore 1992, 2007).

The interest in leisure activities, and in bridge and poker in particular, has now been forcefully revived by Akerlof and Shiller (2010), who argue that the decline of bridge and the increase in popularity of poker is a clear indication of the cultural changes that have been taking place from the beginning of the century and which may have led to the recent financial crises. Their way of reasoning echoes the idea that the promotion of bridge appears desirable as it would develop cooperative attitudes improving social welfare. Two of the most influent billionaires in the world, Warren Buffett and Bill Gates, have been advocating this for years, arguing about the importance of teaching bridge starting from the lower school grades. They have recently financed million dollar programs to introduce bridge at school, convinced that "*anyone's good in bridge is gonna be great in a lot of things*"[5] and that in bridge "*You have to look at all the facts. You have to draw inferences from what you've seen, what you've heard. You have to discard improper theories about what the hand had as more evidence comes in sometimes. You have to be open to a possible change of course if you get new information. You have to work with a partner, particularly on defense*".[6]

The idea that activities may shape individual preferences, implicit in the Akerlof and Shiller (2010) argument, is the core of the seminal Henrich et al. (2010) experiment on primitive ethnic groups. These findings document a nexus between social norms and working activity by showing, among other results, that Lamalera whale hunters in Indonesia have an extremely high average contribution (58 percent) as proposers in ultimatum games,[7] the highest among the 15 primitive populations which participated to the experiments. On the other hand, the average contribution of Machiguenga in Perù, who engage only in family activities without cooperation with other village members, is 27 percent. The interpretation for the Lamalera result is that their everyday

[5] Bill Gates in ACBL news archive (2009)

[6] Warren Buffett interviewed by A. Crippen on the CNBC website (2008).

[7] As it is well known, if the offer of the proposer in the ultimatum game is not accepted by the receiver (i.e. because not considered fair) the payoff is nil for both.

activity (hunting whales in large groups with canoes) cannot be performed in isolation and requires a high degree of cooperation and coordination, which progressively creates, and is in turn naturally strengthened, by social norms on equitable sharing rules among workmates (consistent with the Lamalera ultimatum game findings), while it can be threatened by opportunistic behavior. Such strong team and social rules are not required for instance in a primitive group where agriculture is the main activity since agriculture is an activity performed individually, which implies rivalry (and not cooperation) for property of land.

An analogy may be found between these findings and the intuition by Akerlof and Shiller (2010) on the global financial crisis: agents' behavior on financial markets[8] may be rationalized as a consequence of the changes in attitude and behavior that are also apparent from the increase in the number of poker players and the sharp decrease in the number of bridge players in the US. The authors observe that, in 1941, 44 percent of Americans played bridge, a game which was "*recommended as a means of learning social skills*". By contrast, bridge is nowadays considered a game for the elderly and is in strong decline while poker is becoming increasingly popular.[9]

Akerlof and Shiller (2010 p.40) also remark that poker is always played for money, differently from what usually occurs in bridge, and has the characteristics that "deception" ("*variously called bluffing and keeping a poker face*") is one of the most important tactics followed to maximize the

[8] What the authors imply is that the financial crisis, and the opacity and related scandals which occurred in the same period in leading financial institutions, are caused by a deterioration of social skills and an increase in self-regarding attitudes of financial traders (see Akerlof and Shiller, 2010, p. 40). In this respect the Enron story is a typical case in which the gap between declared corporate social responsibility and actual behavior of managers has been remarked by several authors (see, among others, Frey and Osterloh, 2004). An example of how purely self-regarding attitudes and lack of concern for social or team corporate goals may be found in the short term revenue maximizing attitudes of financial traders and/or CEOs, who increased their bonuses and stock option revenues through the pursuit of excessive risk taking actions (ie. accumulated positions on toxic assets) whose negative effects on corporate accounts would have materialized later on.

[9] The average age of English Bridge Union members was 55 in 2006 (The Independent, 2006), while it was 67 for members of the American Contract Bridge League in 2005 (USA Today, 2005).

players' payoff[10]. Their implicit argument is that a professional or an often practiced activity may shape individual preferences, exactly as in Henrich et al. (2010): while poker players are individualistic, bridge players, analogously to whale hunters, develop their cooperation skills consistent with the characteristics of their preferred activity.

The investigation of preferences of bridge and poker players is therefore an important issue which has been so far unexplored in the literature. In this paper we compare preferences of 1,414 bridge and 836 poker players when they play as trustors[11] in simulated experiments with an original data set built in cooperation with the Italian Bridge Federation and the poker on line section of Snai S.p.a., the most important Italian betting agency[12]. The large number of respondents enables us to pursue the threefold goal of checking whether: i) significant differences in trustors' transfers exist between the two groups; ii) such differences are consistent with game characteristics and iii) are caused by game experience or due to players' self-selection. Our assumption is that the first two questions should be answered positively. We argue that differences in preferences may depend on the following crucial distinctive features of the two games: while poker players face rivals, bridge players have a teammate (among the other three at the table) with whom they try to elaborate a strategy to maximize the team score in order to win the game. We therefore conclude that bridge players are more likely to adopt team reasoning instead of standard rationality, thereby sending a significantly higher amount of the endowment received in trust games.[13]

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[10] The reasoning of the authors ends with the following question "*of course there may be no link between what is taking place at the card table and what is taking place in the economy. But if card games played by millions of people shift the role of deception, wouldn't be so naïf simply to assume that such shifts do not occur also in the word of commerce?*" (p.40).

[11] We choose to focus on trustor contribution since it is particularly apt to evaluate whether bridge habits are associated with different preferences. This is because, when team thinking is common knowledge, the optimal choice of the trustor is to give all, while a purely self regarding Nash equilibrium choice would be to give nothing.

[12] A questionnaire on line was proposed to bridge and poker affiliates in the summer 2012. For a detailed description of the modalities of the experiment see Appendix A.

[13] As it is well known, the optimal strategy of a *homo economicus* (that is, of an individual with standard purely self-regarding preferences) trustee in a trust game is to give nothing, while that of a trustee

This should occur even though the analogy between the bridge partnership and the trust game partnership is not perfect. Both trustors and bridge partners may increase their payoff if they cooperate with their partner (the trustee in the case of the trust game, the teammate in the case of the bridge game). However the bridge teammate, differently from the trustee, cannot derive any benefit from an opportunistic behavior against her teammate. In spite of these dissimilarities it is of high interest to test whether the differences in roles of bridge and poker players may affect their decisions in well known game theoretic benchmarks such as simulated trust games. More specifically, one half of the participants to the bridge matches are partners, while all participants to the poker matches are rivals. We may conveniently assume that rivals play as homo economicus (maximize their own payoff), while partners adopt a team reasoning or a we-thinking approach[14] trying to devise strategies which maximize the team payoff.

Our findings do not reject our main hypothesis and provide evidence that bridge players contribute significantly more as trustors than poker players. This is mainly accounted for by a 11 percent higher share of players sending all their game endowment, consistently with the optimal strategy when team rationality is common knowledge. The superior giving of bridge players does not seem to be motivated by risk aversion, pure altruism or inequity aversion. Bridge players in fact, somewhat surprisingly, are also more likely to follow Nash rationality both in the trust and in the dictator game. These findings do not contradict (but actually reinforce) the interpretation that bridge players are more likely to choose strategic altruism, team reasoning or we-thinking. In other words, even though they are no less self-interested than poker players, they are more inclined to behave cooperatively. This is consistent with our theoretical assumption that they are

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following team reasoning is to give back half of the money received. As a consequence, in the presence of common knowledge on *homo economicus* players' characteristics, the optimal strategy for the Nash maximizing trustor would be to give nil, while, in the presence of common knowledge on team reasoning players' characteristics, the optimal strategy will be to give everything.

[14] We use the two terms as synonyms.

more inclined to believe that the anonymous counterpart will behave as a teammate and not as a rival.

The paper is divided into six sections (introduction and conclusions included). The second section outlines our theoretical hypothesis. The third describes our simulated experiment and illustrates descriptive findings. The fourth illustrates our hypotheses and provides parametric and non parametric testing and econometric analysis. The fifth section provides a robustness check on previous results. The final section concludes.

2. Theoretical hypothesis

Nash rationality or individual utility maximizing behavior is the standard assumption on players' preferences. An alternative view (Hodgson, 1967; Regan, 1980; Kramer and Brewer 1984, Gilbert, 1989; Hurley, 1989; Sugden, 1993, 2000 and 2003; Tuomela, 1995; Hollis, 1998; Bacharach, 1997, 1999 and 2006; Gold and Sugden, 2008) takes into account that individuals may use a we-mode instead of a I-mode attitude or, in other terms, wonder "it would be good for us if we did…" instead of the classic Nash rational reasoning "It would be good for me if I did…" (Becchetti, Degli Antoni and Faillo, 2010).

A factor which could facilitate the adoption of team reasoning in social dilemmas is the "common reason to believe" (Sugden 2003). The main idea is that team reasoning has a conditional nature. Members of groups are not committed to reason as a team unless there is a common (reciprocal) motive to believe that other members are doing the same.[15]

[15] "The internal problem is that, from the viewpoint of any individual, the validity or acceptability of team reasoning, narrowly defined, may be conditional on his confidence that other members of the team are reasoning in a similar way" (Sugden 2003, p.168).

Team thinking may be stimulated by the specific features of the game structure. The game we use in our simulated experiment, the trust game, has the property of "strong interdependence" (Bacharach, 2006), that is, of a game in which (as in Prisoners' dilemma or Traveller's game) there exists an outcome preferred by both partners which can be achieved with we-thinking, which is Pareto superior with respect to the outcome which would be attained with standard individual rationality.

We assume that a bridge player has a higher predisposition to we-thinking than a poker player. Such higher predisposition is given by her regular practice of a game in which success may be obtained by using we-thinking with her playing partner.

Note that in our simulated experiment we do not specify whether the counterpart of the trust game is another bridge/poker player in order to avoid to generate a framing effect which could excessively reinforce our hypothesis. In addition, the game is just simulated and therefore the presence of the trustees is just hypothetical. However, it may well be that a bridge player's attitude to endorse we-thinking would be strengthened if she attaches a higher probability to the fact that the trustee is also a bridge player or if she is told so in the instructions of the game. In this sense we created weaker conditions for our test since we do not rely on the "common reason to believe" argument (Sugden, 2003).

Note also that, in case our null hypothesis (no difference in trust game behavior between bridge and poker players) is rejected, a problem of observational equivalence may arise. The finding may be interpreted in the sense that bridge practice develops cooperative attitudes or, alternatively, that individuals having ex ante higher social preferences are more likely to become bridge than poker players. We will try to disentangle between these two observationally equivalent interpretations of the rejection of the null (causal effect of the game on preferences or self-selection) in the sensitivity analisys provided in section 5.

Consider finally that the most common interpretations for trustors' deviation from Nash Equilibrium are pure altruism, strategic altruism, inequity aversion, and risk (Karlan, 2005, Eckel and Wilson, 2004). In our experiment we can investigate whether differences between poker and bridge trustors' transfers are robust when controlling for (simulated) experimental measures of risk aversion and dictator's giving (proxying for inequity aversion and altruism). If this is the case the difference in transfers between bridge and poker player trustors should be explained mainly by what is called "strategic altruism", that is, by a typical motivation of the we-thinking mode.

3. The survey and the simulated experiments

The trust investment game is a well-known sequential game which illustrates an important social dilemma: trusting individuals (in an economic environment which is typically characterized by asymmetric information and incomplete contracts as it is implicit in the game) may be rewarding (and produce super-additive outcomes), but it is also a "social risk" since the counterpart's opportunism may lead the trusting players to a result which is inferior to that obtained with the non-cooperative strategy. Berg, Dickhaut and McCabe [1995]develop this idea in their sequential two player game in which a trustor, the first mover, has to decide the share of her endowment that she wants to transfer to an anonymous counterpart (the trustee). The amount sent by the trustor is tripled[16] due to the game rules. After this choice the trustee moves and may return to the trustor a share of what she received (including all or nothing).

[16] One of the rationales for tripling the trustor contribution in the game rules is due to the assumption of the superadditive effects of social capital. With high levels of trust individuals share information and knowledge and cooperate, thereby generating outcomes which go beyond the sum of their stand-alone contributions.

In the Nash equilibrium of the game in which both players adopt individual rationality, and individual rationality is common knowledge (that is, each player expects that the counterpart will adopt individual rationality), both trustor and trustee transfers are zero and the individual and aggregate payoffs are suboptimal. By contrast, if the two players adopt a we-thinking attitude, and we-thinking is common knowledge (that is, each player expects that the counterpart will adopt the same we-thinking attitude), both players do their best to maximize the aggregate outcome and divide it in equal parts.[17] That is, the trustor will send all, the trustee will receive it tripled and return half of it.

In our simulated trust game the trustor is told to receive 100 euros and has to decide the amount of her endowment to give to another anonymous player (the trustee) knowing that the amount will be tripled and that the trustee will choose how much of the amount to return to the trustor. The game is only simulated and no real money is at stake.

Our design also includes, beyond the trust game, a dictator game and a risk aversion simulated experiment in order to measure separately participants' risk attitudes and other regarding preferences.

In the dictator game a sender is told to receive an amount of money (100 euros in our case) and has to decide how much to transfer to a second anonymous player (receiver). After this decision the game ends. Since there is no reply from the receiver the sender does not send nothing if she follows Nash rationality. Deviations from Nash rationality (non-zero transfers) are therefore generally explained in terms of altruism or inequity aversion.

[17] Assuming that we-thinking players are also inequality averse they will maximize and divide in equal parts the team outcome.

Last, we propose a standard test to measure risk aversion. The test is based on the mean preserving spread principle. It asks to choose between six different lotteries having distributions with the same mean value but ranked in ascending order of variance.[18]

The dictator game and the risk aversion simulated experiment are proposed in order to extract variables which can be used as controls when trying to provide a rationale to trustors' transfer in the main simulated experiment. The experiment was proposed through an online survey. For bridge players it was managed by the official website of the Italian Bridge Federation, while for poker players by the Snai S.p.a. through a registration process. The respondents in both cases are affiliated regular players[19].

3. Database and descriptive evidence

Our sample is represented by 1,414 poker and 836 bridge players who participated online to our mini-survey and simulated experiment.[20] Properties of the two groups are not balanced since bridge players are 15-year older (around 56 against 41 year old poker players) and females for a higher share (26 against 7 percent). The age difference for Italy further confirms the evidence from the US (see footnote 9) and the observation by Akerlof and Shiller (2010) that bridge is becoming a game for the elderly (see Table 3).

Due to the imbalanced socio-demographic characteristics of our respondents, the robustness of results from standard parametric and non parametric tests (section 4) will be checked with econometric analysis controlling for the influence of such factors (section 5) and sensitivity

[18] The test is traditionally considered in the literature as the most easily understandable alternative to more complex experimental schemes to elicit risk and time preferences such as those of Andersen et al. (2008) and Holt and Laury (2002).

[19] See Appendix A for a detailed description of the modalities of the experiment

[20] Variable legend and descriptive statistics for the variables used in the empirical analysis are provided in Tables 1 and 2 respectively.

analysis testing the robustness of our findings to departures from the assumption of conditional independence of potential outcomes and treatment assignment given observables (Conditional Independence Assumption, CIA) (section 6).

4. Hypothesis testing

We test the following three null versus alternative hypotheses:

i)	*Trust*	H_{0A}: $TR^{Poker} = TR^{Bridge}$	*vs.*	H_{1A}: $TR^{Poker} < TR^{Bridge}$
ii)	*Risk aversion*	H_{0B}: $RA^{Poker} = RA^{Bridge}$	*vs.*	H_{1B}: $RA^{Poker} > RA^{Bridge}$
iv)	*Altruism*	H_{0C}: $AI^{Poker} = AI^{Bridge}$	*vs.*	H_{1C}: $AI^{Poker} > AI^{Bridge}$

Both parametric and non parametric tests document that the first null hypothesis is strongly rejected in the expected direction. Bridge players exhibit a significantly higher level of trust than poker players in both parametric (t-stat -4.00, p-value 0.000) and non-parametric tests (z-stat -2.63 p-value 0.008). In terms of magnitude the difference is 7 points since bridge players send on average 48 against 41 experimental units, that is, 17 percent more than poker players' average (see Table 4).

If we look at the distribution of choices we find that most of the difference depends on what happens on the extreme transfers (Figure 1). A far higher share of bridge players follows team rationality by sending all (31 against 20 percent) while, somewhat surprisingly, a higher share of bridge players also follows Nash rationality sending zero even though the distance here is smaller (30 against 24). This implies strong rejection of the hypothesis that the share of team rational players is the same among bridge and poker players (non-parametric test z-stat -34.55, p-value 0.000 and parametric test t-stat -5.92, p-value 0.000), but also that the share of Nash maximisers is the same among bridge than among poker players (non-parametric test z-stat 11.65, p-value 0.003 and parametric test t-stat -3.44, p-value 0.002).[21] This evidence also tells us that bridge players' choices are much more polarized than those of poker players' (61 percent of bridge players make an extreme choice against 44 percent of poker players). As expected, rejection of the null is even sharper in this case (non parametric test z-stat 64.64, p-value 0.000 and parametric test t-stat 8.15, p-value 0.000). Beyond polarized choices the tendency of bridge players to give more is reinforced by what happens in next-to-polarized choices where bridge players chose in a higher proportion than poker players transfers of 80 and 90 euros and, in lower proportion, transfers in the range from 10 to 70 euros (see Figure 1).

According to the literature on trust games (section 3), superior transfers of trustors have been interpreted in terms of lower risk aversion, higher pure or strategic altruism and higher inequity aversion. Our separate test of risk aversion shows indeed that bridge players are slightly less risk averse (non parametric test z-stat 4.13, p-value 0.000 and parametric test t-stat -2.90, p-value 0.002). Furthermore, our test on "other regarding preferences" documents that they give significantly less in the dictator game where giving may be interpreted as determined by pure altruism or inequity aversion, even though in this case only the non parametric test rejects the null at high levels of significance (non parametric test z-stat 3.95, p-value 0.000 and parametric test t-stat 1.83, p-value 0.067). Here again, the result is strongly influenced by the fact that bridge players' choices are much more polarized and bridge players are more likely to follow Nash rationality.

[21] We approximate trustor giving to a continuous variable and therefore test the between-subject difference with the Mann-Withney test. For all the other dichotomous variables in Table 4 we test differences in proportions with Chi square. The difference between poker and bridge players remains highly significant if we remove the simplifying assumption of continuity on trustor giving and test the difference of distributions.

A first conclusion from these tests is that bridge player trustors give significantly more but not because they are more altruistic or inequity averse.

The econometric analysis which follows may help us to check whether our findings on trustor transfers are robust to confounding factors (older people and women are over-represented among bridge players as compared to poker players as shown in Table 3) and whether they are more or less significant once we control for risk aversion and dictator giving.

4. Econometric analysis

Our benchmark specification is

$$\mathrm{TrustorG_i} = \alpha_0 + \alpha_1 \mathrm{DBridge_t} + \sum_{\mathrm{i}} \beta_{\mathrm{i}} \mathrm{X_{it}} + \varepsilon_{\mathrm{i}}$$

where *TrustorG* is a measure of trustor giving, *DBridge* a dummy taking value one if the survey respondent is a bridge player (implying that the respondent is a poker player when it is zero) and X are controls which include a gender dummy, age classes and (accordingly to the different specifications), a dummy for early responses,[22] our experimental measures of risk aversion and dictator giving, regional and province dummies and/or proxies of education and social capital.[23]

The advantage of this regression is that we can introduce simulated experiment results on the dictator and risk aversion experiments and therefore control whether the differences in trustor' transfers depend on factors different from risk aversion, pure altruism and inequity aversion.

In Table 5 the dependent variable is trustor's giving and specifications are estimated using OLS, thereby implicitly assuming that trustor giving is continuous.[24] Standard errors are clustered at

[22] The survey for bridge players was launched on July 2012 and remained online up to the end of September. The dummy gives value one to those answering before the midterm.

[23] Details on the construction of age classes, regional and province dummies are provided in Table 1.

[24] Equivalence of results from OLS and ordered logit in presence of a discrete variable with eleven values such as our one has been demonstrated among others by Clark (2003); Ferrer–i–Carbonell and Frijters,

province level. We first include only gender and age as controls (column 1), then add experimental measures of risk aversion and dictator giving (column 2), (20-1) region or province dummies[25] (columns 3 and 4) and experimental measures plus region or province dummies as additional regressors (columns 5 and 6). We finally replace province dummies with proxies of human and social capital at province level (column 7).[26]

Findings illustrated in Table 5 document that the bridge dummy variable is always significant but the magnitude of its impact is larger when the other two experimental measures are added (passing from around 11-12 to around 15-16 experiment units). This implies that, once we control for risk aversion and dictator giving (the latter presumably capturing both pure altruism and inequity aversion), the bridge effect is larger. This is consistent with our original hypothesis that bridge players are more trained to we-thinking and team-thinking, that is, they do not give more due to higher altruism, inequity aversion or lower risk aversion, but because they are more accustomed to expect a more cooperative behavior from their counterpart. With regard to the significance of other regressors note that our proxy of bridging social capital at province level in column 7 (the number of social cooperatives) is positive and significant consistently with what can be assumed on theoretical grounds about the relationship between social capital and trustor giving. Human capital is also shown to affect our dependent variable since the provincial share of those whith higher than intermediate education is positive and significant.

In Table 6 we take as reference our test on the relationship between bridge and team rationality. We therefore estimate a probit model where the dependent variable is a dummy taking value of

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(2004) and Ferrer-I-Carbonell and Van Praag (2004, 2008). The ordered probit estimate in Appendix C confirms the significance of our findings.

[25] In Italy there are 20 regions (big administration districts) encompassing 110 provinces (smaller administrative areas, roughly coinciding with the biggest urban areas)

[26] We use as proxy of human capital the province population share of inhabitants with higher than intermediate school degree and as proxy of social capital the number of cooperatives and the number of donations in the province.

one if the trustor follows team rationality (gives all) and zero otherwise. Controls are arranged as in Table 1 in the seven different specifications. Our findings document that playing bridge raises by 10-11 percent the probability of being team maximisers (consistently with what found descriptively) and by 14-15 percent when we control for risk aversion and dictator giving (Table 6, columns 2, 5 and 6).

In Table 7 we replace the dummy picking up the top extreme choice with a *Polarized* dummy picking up both (top and down) extreme choices. As expected the *Brigde* dummy grows both in significance and magnitude (adding 19 percent to the probability of making polarized choices).

To sum up, our empirical analysis highlights three strong results which are robust in both parametric tests, non parametric tests and regression analysis once controlled for additional confounding factors: bridge players i) choose in a significantly higher proportion the top extreme choice which is the optimal choice when both players follow team rationality (and assume that also the counterpart will do so); ii) are significantly more polarized on the two extreme choices (team or Nash rationality); iii) seem motivated significantly more by "strategic altruism" in their team rationality choice (the result of higher trustor giving is reinforced and stronger in magnitude once we control for risk aversion and dictator giving).

These findings support our hypothesis that the bridge game is associated with a significantly higher attitude to we-thinking or team rationality. They however also show some apparently counterintuitive evidence by documenting that poker players are significantly more risk averse and significantly less Nash maximisers. Hence, poker players do not seem to behave like irresponsible gamblers or act more selfishly compared to bridge players, but they just act less cooperatively, as in the nature of the game. The fact that bridge players choices are more polarized makes their choices even more clear cut. Therefore bridge players are indeed led to choose significantly more team rationality, even though they are not more altruistic than poker players.

5. Discussion of our results

One limit of our experiment could be the absence of real money, although there is a trade-off between the use of real money and the number of participants to the simulated experiment. We exploit this advantage by administering our test to a large number of respondents. Note as well that several examples of simulated experiments where no money is at stake exist whose findings are similar to those of analogous experiments with monetary incentives. To quote just an example, Rubinstein (2007) uses response time data in simulated experiments without monetary payoffs and concludes that in his experiment declaring $300 (the largest number) can be interpreted as an instinctive (emotional) choice, while choices in the range 255-299 appear as the ones which imply the strongest cognitive effort[27].

We also need to check whether our findings are robust to selection bias. The absence of an ex ante random selection of participants to the two bridge and poker player groups does not tell us whether our results depend on the impact of the game characteristics on players' preferences or, instead, on a selection bias which brings individuals with higher social capital to become bridge rather than poker players. In such case the shift in the share of bridge/poker players should be considered not the cause but a signal of a change in preferences (reduction of we or team reasoning) which may be caused by other factors. To clarify this point we propose in the next section a sensitivity analysis to see whether the observed correlation is robust when we remove the conditional independence assumption and simulate the effect of a confounder correlated with both the treatment and the outcome.

[27]Rubinstein also documents that the distribution of answers given by these subjects is similar to that obtained by Goeree and Holt (2001) in paid experiments.

5.1 Sensitivity analysis

A key assumption for the validity of our main result in identifying a causality nexus from the (poker or bridge) activity to individual preferences relies on the assumption of CIA. This means that what leads individuals to become bridge or poker players must be independent from the outcome we intend to observe (trustor transfer). We are aware that this is not necessarily the case in our empirical analysis. There may be factors, such as family education, which may drive both the decision to become a bridge player and the observed outcomes of our simulated experiments.

In order to evaluate whether and to what extent the observed difference between bridge and poker players is robust to deviations from the CIA assumption we perform the Ichino et al. (2006) sensitivity analysis[28]. This can be done by modelling a "confounder" (an additional unobservable binary variable) and, more specifically, the probabilities of the effect of such variable on our data using it as an additional covariate in the matching regression[29].

The approach requires the transformation of our outcome variable in a dichotomous variable. Given that our two sharper results are on the share of trustors giving all (team or we-thinking trustors) and on the trustors making polarized choices, we decide to perform our sensitivity analysis on the polarized dummy variable. The baseline effect of the bridge dummy on polarized choices is 0.175 and is highly significant (WSE: 0.022, t-stat 8.01).

Our findings document that in all the performed simulations the bias is small and the simulated Average Treatment Effect on Treated (ATT) remains positive and significant (Table 8). The ATT remains strongly significant for any simulated confounder even under the extreme assumption

[28] See also Blatmann and Annan (2010), Rosenbaum and Rubin (1983) and Imbens (2003).

[29] For further details on the sensitivity analysis see Appendix B.

that the probability of coming from a highly educated family is 50 percent higher for bridge players following team rationality than for those not following team rationality (*maximum simulated outcome effect for the treated*). Our main findings remain robust even when we remove the assumption that the confounder does not modify odds for poker players. Under the most unfavourable scenario we assume that the probabilty of coming from a highly educated family is 30 percent higher for poker players following team rationality than for those not following team rationality (*maximum simulated outcome effect for the control*). The robustness of our results is also confirmed when there is a 30 probability point difference between being bridge players and being poker players when coming from a highly educated family (p1.-p0.) (*maximum simulated effect of the confounder on selection into treatment*).

The probability differences assumed for our killer confounders are by far larger if compared with the same conditional probabilities for observables (male gender, age above median, dummy for early respondents) which therefore produce even smaller biases (Table 8, first three rows)[30]. This gives us additional confidence on the robustness of our findings to reasonable deviations from CIA.

6. Conclusions

Our paper provides original evidence on whether the relative change in leisure activity preferences. Notably the switch from playing bridge to poker may be related to the shift in financial agents' practices which lie at the root of recent financial crises and scandals as suggested by Akerlof and Shiller (2010). More specifically, we test whether the implicit assumption that the reduction in the number of bridge players and the increase in the number of poker players imply a reduction of social skills.

[30] Under this assumption the largest difference in terms of maximum simulated outcome for the treated or for the control group (d1 or d0) is slightly less than .10, while for our killer confounders we consider a much wider difference (up to .6 percent).

Using a large scale online survey which proposes a simulated trust experiment to bridge and poker players we document that the differences between the two are quite significant. While trustor giving does not vary much according to geographical areas, bridge players give significantly more (one sixth more than average, which becomes around one fourth more than average when controlling for risk aversion and other regarding preferences proxied by dictator giving). Beyond this average outcome we document that bridge players decide to send all in a higher proportion (31 to 20 percent), even though they are also Nash maximisers in a higher proportion (30 against 24). This implies that bridge players' choices are far more polarized than those of poker players. Our main findings are robust to econometric analysis which controls for confounding factors and to sensitivity analysis based on the removal of the CIA assumption.

These findings are consistent with our "whale hunting" hypothesis, that is, that bridge players (exactly as Lamalera whale hunters which are the group with the strongest other regarding preferences in the well known Heinrich et al. (2010) paper), due to the characteristics of their distinctive activity, are more trained to team and we-thinking than poker players. As a consequence they are more likely to choose the (giving all) cooperative equilibrium and their superior trustor giving is mainly explained by strategic altruism.

Our findings provide support, in addition to the motivations illustrated by Bill Gates and Warren Buffett, to the view that promoting bridge and, in general, any activity enhancing cooperative attitudes starting from our educational system may highly contribute to the maximization of social welfare.

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Appendix A: – The simulated experiment and the questionnaire

The following questionnaire was proposed to bridge players over the period July 15th –September 30, 2012 via the official web site of the Italian Bridge Federation (FIGB), which counts 24,900 affiliates, all identified by a code number, necessary to play official competitions at club, national and international level. Such a code is also necessary to play in the bridge tournaments on line organized daily by the American Contract Bridge League. The total number of respondents was 843.

The questionnaire was proposed to poker players from July 9th to July 31st 2012 by SNAI via a secure system developed for them by the specialized firm Problem Free Limited.

Registered poker players, all identified by their social security number, once logged in the secure playing platform could see the popup proposing the questionnaire. The sample of respondents was 1,401.

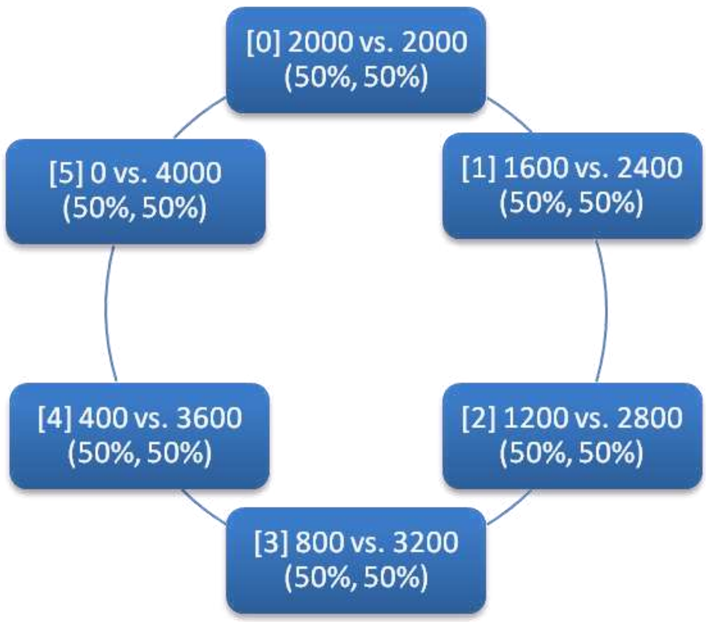
The questionnaire

1. Sex M F

2. Age

3. Choose which of the "head or tail" lotteries shown below you prefer to participate [indicating the number in square brackets]

   For each lottery we indicate in round brackets the probability of the above indicated win. This is an "head or tail" lottery where each of the two outcomes has a 50 percent probability of occurrence. (i.e. lottery [3] indicates that, by choosing this lottery, you have a 50 percent probability of winning 800 euros and a 50 percent probability of winning 3200 euros)



4. Assume you are given an amount of 100 euros and you can choose how much of this amount (between 0 and 100) you can give to an anonymous player. The amount sent will be multiplied by 3 (ie. if you send 100 it will become 30, if you send 100 it will become 300) and given to the anonymous player. At this point the anonymous player will decide how much to send back to you. He also will not know your identity. After this choice the game ends.

   How much would you give? Please choose one among the following:

   0 – 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 90 – 100

5. Assume you are given an amount of 100 euros and you can choose how much of this amount (between 0 and 100) you can give to an anonymous player. After this choice the game ends.

How much would you give? Please choose one among the following:

0 – 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 90 – 100

Appendix B: – Sensitivity analysis

The sensitivity analysis allows us to assess to what extent our baseline ATT (see section 5.1) is robust to the exclusion of a potential confounder that might have different characteristics.

The distribution of the confounder *U* is then described on the basis of four choice-parameters:

$$p_{ij} = Pr(U = 1 | T = i, Y = j) = Pr(U = 1 | T = i, Y = j)$$

with *i, j* = {0*,* 1}, where Y is the outcome (that is, the binary transformation of the outcome for continuous outcomes, in our case the probability of team or polarized rationality) and T is the binary treatment (T=1 equals being a bridge player).

In this way we may model each simulation parameter p_{ij} as representing the probability that U=1 if T=i and Y=j.

We conveniently conceive our potential confounder as a trait that makes individuals more likely to become bridge players (T=1) and, at the same time, more likely to make polarized choices in the trust game (Y=1). An example of it may be, say, family education which may increase both the probability of selection into treatment (becoming bridge player) and outcome (behaving as a polarized player, that is, choosing the maximum or the minimum). If we define our outcome variable as *POLARIZED*, a reasonable way to model the distribution of the confounder is by setting:

i) $p_{11} > p_{10}$, so that *Pr(U = 1| Bridge = 1|Polarized = 1) > Pr(U = 1| Bridge = 1|Polarized = 0)* – implying that the probability of coming from a highly educated family is higher for bridge players who follow polarized choices than for bridge players who do not follow polarized choices*;*

ii) $p_{01} = p_{00}$, so that *Pr(U = 1| Bridge = 0 |Polarized = 1) = Pr(U = 1| Bridge = 0|Polarized = 0)* - implying that the probability of coming from a highly educated family is the same for poker players who follow polarized choices than for poker players who do not follow polarized choices;

iii) $p_{1}.>p_{0}.$ so that *Pr(U = 1|Bridge = 1) > Pr(U = 1|Bridge = 0)*, implying that the probability of coming from a highly educated family is higher for bridge than for poker players. In other words, the confounder has a positive effect on treatment assignment.

Following Ichino et al. (2006), we define $d_1 = p_{11} - p_{10}$, $d_0 = p_{01} - p_{00}$ and $s = p_1. - p_0.$ in order to characterize the sign of the bias when estimating the baseline ATT (i.e. computed when *U* is not in the matching set). In our framework we look at cases in which $d_1 > 0$ and $d_0 = 0$ (*positive effect of U on treated outcome and no effect of U on the untreated outcome*) and $s > 0$ (*positive effect of U on selection*). In this way it is possible to identify the levels of d_1 and *s* producing an estimated ATT substantially different from the baseline ATT and discuss to what extent the existence of a "killer" confounder with these characteristics is plausible.

Results are reported in Table 8 and include simulations where the maximum d_1 is .6, while the maximum d_0 is .3.

All tables report values for s, the new ATT, the percent bias (calculated as the difference between the baseline ATT and the simulated ATT scaled on the original ATT), the within estimated standard error (WSE).

Table 1. Variable legend

Male	Dummy taking value one if the respondent is male
Trustor transfer	Amount sent by the trustor in the simulated trust game
Dictator giving	Amount sent by the sender in the simulated dictator game
Risk aversion	Lottery chosen in the risk aversion test based on the mean preserving spread principle (see Appendix A). The six lotteries have the same mean and are ranked on the basis of ascending order of variance (ie. 0=lowest risk aversion,..,5= highest risk aversion)
Early response	Dummy for early respondents (responses before midterm) in the online survey
Above intermediate education	Share of inhabitants above 15 years old with more than intermediate school degree at province level
Donations	Total amount of officially registered donations in the province
Social cooperatives	Number of social cooperatives created at province level

Table 2. Descriptive statistics

Variables	N. of obs.	Mean	S.Dev.	Min.	Max.
Male	2250	.8613333	.3456752	0	1
Age	2249	46.31881	14.12858	3	106
Risk aversion	2250	4.711111	1.713626	1	6
Trustor giving	2250	43.46222	38.11318	0	100
Early response	2250	.5368889	.4987482	0	1
Above intermediate education	2232	44.74172	6.60362	35.20577	57.17015
Donations	2232	16.99494	5.870778	6.8	31.9
Social cooperatives	2232	21.14651	21.2846	0	65

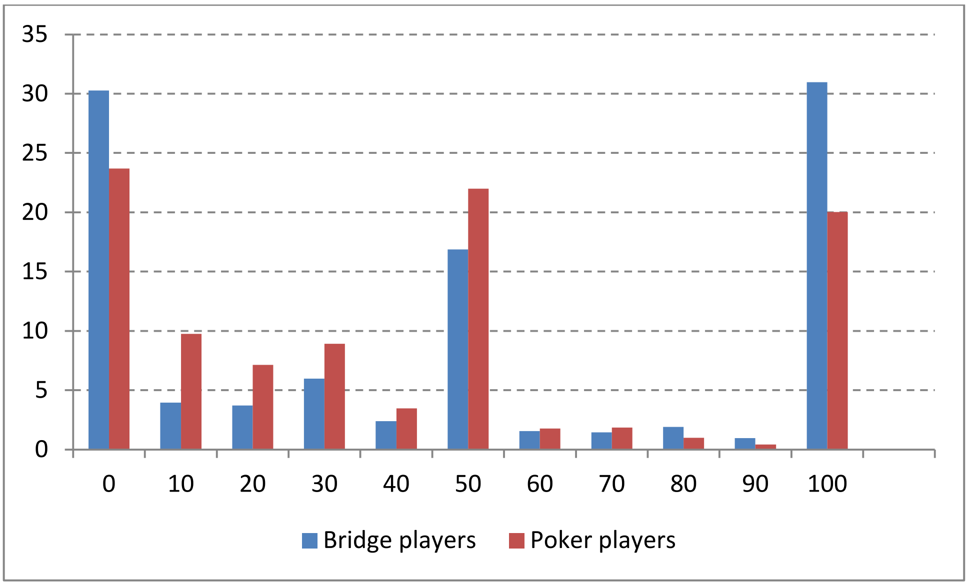
Variable legend: see Table 1

Table 3 Characteristics of bridge and poker players

Variables	Bridge Players (1) (Means)	Poker Players (2) (Means)	Non parametric test* H0: (Poker) = (Bridge) (P-value)	Parametric test T- test H0: (Poker) = (Bridge) (P-value)
Male	74.2	93.21	159.60 (0.00)	13.10 (0.00)
Age	55.75	40.73	-25.11 (0.00)	-28.39 (0.00)

* For continuous variables (Age) we test - through nonparametric statistics - between-subject differences by using the Mann-Whitney test. For dichotomous variables (Male) we use the Chi square test to analyse the differences in proportions

Figure 1 Trustor giving for bridge and poker players



Horizontal axis:trustor contributions. Vertical axis : percent value of players on the total sample

Table 4. Hypothesis testing(differences between groups)

Variables	Bridge Players (1) (Means)	Poker Players (2) (Means)	Non parametric test* H0: (1) = (2) (P-value)	Parametric test T- test H0: (1) = (2) (P-value)
Trustor giving	47.63	41.00	2.63	4.00
			(0.008)	(0.000)
We(team)-thinking (%)	30.98	20.01	34.55	5.92
			(0.00)	(0.00)
			11.65	-3.44
Nash (%)	30.26	23.69	(0.00)	(0.002)
			64.64	8.15
Polarized (%)	61.24	43.60	(0.00)	(0.00)
			4.13	-2.896
Risk aversion	4.838	4.01	(0.00)	(0.002)
			3.95	1.83
Dictator giving	18.82	21.31	(0.00)	(0.067)

* For (approximated) to continuous variables such as trustor giving we test - through nonparametric statistics - between-subject differences by using the Mann-Whitney test. For dichotomous variables (all the other variables) we use the Chi square test to analyse the differences in proportions.

Table 5. The determinants of trustor giving

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	2.337	5.836***	2.629	2.909	5.901***	5.797***	5.949***
	(1.989)	(1.647)	(1.965)	(2.171)	(1.639)	(1.776)	(1.624)
30-40 age class	7.256**	5.808*	7.085**	7.257**	5.406*	5.386*	5.633*
	(3.072)	(2.950)	(3.138)	(3.305)	(3.006)	(3.182)	(3.018)
40-50 age class	10.49***	7.775***	10.45***	10.75***	7.484***	7.797***	7.446***
	(2.399)	(2.053)	(2.334)	(2.442)	(2.036)	(2.140)	(2.004)
50-60 age class	9.309***	4.024*	9.210***	9.276***	3.761	3.575	3.686
	(2.492)	(2.404)	(2.475)	(2.549)	(2.390)	(2.513)	(2.405)
60-70 age class	7.559**	2.597	7.337**	7.112**	2.407	2.167	2.191
	(3.358)	(2.854)	(3.389)	(3.464)	(2.912)	(2.974)	(2.857)
70-80 age class	0.0818	-7.080	0.0578	-0.441	-6.735	-7.031	-7.271*
	(4.491)	(4.285)	(4.483)	(4.561)	(4.253)	(4.250)	(4.365)
Above 80 age class	3.068	-1.998	3.242	-0.971	-1.873	-4.154	-2.893
	(13.34)	(8.311)	(13.36)	(14.81)	(7.892)	(9.274)	(7.885)
Bridge	6.438***	10.65***	6.852***	6.950***	10.74***	10.45***	10.46***
	(1.847)	(1.522)	(1.920)	(1.994)	(1.543)	(1.655)	(1.518)
Early response			-1.308	-0.905	0.598	0.771	0.606
			(1.519)	(1.592)	(1.443)	(1.518)	(1.435)
Risk aversion		-0.476			-0.448	-0.503	-0.457
		(0.436)			(0.431)	(0.439)	(0.438)
Dictator giving		0.539***			0.540***	0.542***	0.540***
		(0.0208)			(0.0207)	(0.0220)	(0.0206)
Above Intermediate Education							0.0293
							(0.0578)
Donations							0.135
							(0.138)
Social cooperatives							0.0761**
							(0.0302)
Province dummies	NO	NO	NO	YES	NO	YES	NO
Region dummies	NO	NO	YES	NO	YES	NO	NO
Constant	31.84***	21.74***	24.98***	24.31***	16.33***	16.63***	16.39***
	(2.439)	(3.425)	(2.469)	(2.547)	(3.583)	(3.702)	(6.026)
Observations	2,238	2,238	2,238	2,238	2,238	2,238	2,231
R-squared	0.016	0.207	0.022	0.052	0.211	0.236	0.208

Variable legend: see Table 1. Standard errors in parentheses are clustered at province level . *** p<0.01, ** p<0.05, * p<0.1. Age class: the omitted benchmark is the age class below 30.

Table 6. The determinants of the maximum trustor giving choice

(Dependent variable is 1 if transfer=100 or zero otherwise)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.0589***	0.0630***	0.0691***	0.0877***	0.0889***	0.0935***	0.0894***
	(0.0217)	(0.0204)	(0.0215)	(0.0189)	(0.0178)	(0.0182)	(0.0180)
30-40 age class	0.104**	0.0995**	0.111**	0.0903**	0.0842**	0.0944**	0.0899**
	(0.0406)	(0.0403)	(0.0448)	(0.0434)	(0.0425)	(0.0476)	(0.0443)
40-50 age class	0.118***	0.113***	0.131***	0.0912***	0.0838**	0.103***	0.0900***
	(0.0356)	(0.0343)	(0.0382)	(0.0346)	(0.0335)	(0.0374)	(0.0345)
50-60 age class	0.127***	0.119***	0.129***	0.0757**	0.0678*	0.0724*	0.0731*
	(0.0347)	(0.0342)	(0.0378)	(0.0369)	(0.0366)	(0.0401)	(0.0377)
60-70 age class	0.102**	0.0894**	0.0949**	0.0523	0.0406	0.0428	0.0460
	(0.0408)	(0.0395)	(0.0426)	(0.0401)	(0.0391)	(0.0418)	(0.0396)
70-80 age class	0.0399	0.0311	0.0206	-0.0270	-0.0299	-0.0400	-0.0304
	(0.0478)	(0.0459)	(0.0480)	(0.0519)	(0.0500)	(0.0505)	(0.0512)
Above 80 age class	0.0471	0.0456	-0.0313	-0.0128	-0.0171	-0.0631	-0.0210
	(0.134)	(0.131)	(0.103)	(0.0829)	(0.0802)	(0.0679)	(0.0781)
Bridge	0.110***	0.117***	0.124***	0.154***	0.158***	0.164***	0.155***
	(0.0201)	(0.0211)	(0.0235)	(0.0191)	(0.0195)	(0.0218)	(0.0195)
Early response		-0.0277	-0.0285		-0.0127	-0.0147	-0.0128
		(0.0183)	(0.0199)		(0.0187)	(0.0204)	(0.0189)
Risk aversion				-0.000242	3.65e-05	-0.00166	-0.000104
				(0.00538)	(0.00509)	(0.00527)	(0.00538)
Dictator giving				0.00404***	0.00399***	0.00419***	0.00403***
				(0.000281)	(0.000293)	(0.000329)	(0.000288)
Above Intermediate Education							0.00189**
							(0.000891)
Donations							0.00274
							(0.00194)
Social cooperatives							0.00111**
							(0.000432)
Province dummies	NO	NO	NO	YES	NO	YES	NO
Region dummies	NO	NO	YES	NO	YES	NO	NO
Constant	-1.312	-6.966	-7.026	-1.701	-7.459	-7.492	-2.187
	(0.12)	(0.23)	(0.16)	(0.16)	(0.17)	(0.18)	(0.29)
Observations	2,238	2,238	2,166	2,238	2,238	2,166	2,231
Pseudo_R-squared	0.0218	0.0307	0.0541	0.1108	0.1192	0.1455	0.1133
Log pseudolikelihood	-1209.70	-1198.71	-1150.57	-1099.57	-1089.27	-1039.33	-1094.81

Variable legend: see Table 1. Standard errors in parentheses are clustered at province level . *** p<0.01, ** p<0.05, * p<0.1. Age class: the omitted benchmark is the age class below 30.

Table 7. The determinants of the trustor polarized choices (Dependent variable is 1 if transfer=100 or 0)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.135***	0.140***	0.149***	0.134***	0.139***	0.148***	0.134***
	(0.0282)	(0.0275)	(0.0283)	(0.0282)	(0.0276)	(0.0282)	(0.0275)
30-40 age class	0.0701*	0.0639*	0.0678*	0.0706*	0.0647*	0.0685*	0.0674*
	(0.0384)	(0.0387)	(0.0412)	(0.0388)	(0.0391)	(0.0416)	(0.0387)
40-50 age class	0.0561*	0.0476	0.0554	0.0556*	0.0473	0.0548	0.0544*
	(0.0326)	(0.0325)	(0.0346)	(0.0329)	(0.0329)	(0.0351)	(0.0331)
50-60 age class	0.0742**	0.0610*	0.0655*	0.0762**	0.0631*	0.0673*	0.0729**
	(0.0343)	(0.0341)	(0.0374)	(0.0342)	(0.0341)	(0.0372)	(0.0349)
60-70 age class	0.0524	0.0409	0.0446	0.0533	0.0418	0.0452	0.0461
	(0.0393)	(0.0392)	(0.0419)	(0.0402)	(0.0401)	(0.0427)	(0.0403)
70-80 age class	0.0548	0.0472	0.0357	0.0572	0.0492	0.0370	0.0518
	(0.0701)	(0.0697)	(0.0735)	(0.0714)	(0.0712)	(0.0749)	(0.0718)
Above 80 age class	0.0364	0.0264	-0.0499	0.0335	0.0234	-0.0549	0.0282
	(0.156)	(0.162)	(0.165)	(0.153)	(0.159)	(0.162)	(0.158)
Bridge	0.192***	0.193***	0.196***	0.189***	0.190***	0.194***	0.187***
	(0.0257)	(0.0269)	(0.0293)	(0.0260)	(0.0272)	(0.0294)	(0.0268)
Early response		-0.0191	-0.0209		-0.0207	-0.0222	-0.0235
		(0.0234)	(0.0245)		(0.0231)	(0.0241)	(0.0230)
Risk aversion				0.00582	0.00593	0.00555	0.00588
				(0.00550)	(0.00536)	(0.00558)	(0.00552)
Dictator giving				-0.000290	-0.000290	-0.000231	-0.000303
				(0.000377)	(0.000370)	(0.000390)	(0.000372)
Above Intermediate Education							0.000954
							(0.00104)
Donations							0.00284
							(0.00208)
Social cooperatives							0.000639
							(0.000531)
Province dummies	NO	NO	YES	NO	NO	YES	NO
Region dummies	NO	YES	NO	NO	YES	NO	NO
Observations	2,238	2,238	2,214	2,238	2,238	2,214	2,231
Pseudo_R-squared	0.0218	0.0307	0.0541	0.1108	0.1192	0.1455	0.1133
Log pseudolikelihood	-1209.70	-1198.71	-1150.57	-1099.57	-1089.27	-1039.33	-1094.81

Variable legend: see Table 1. Standard errors in parentheses are clustered at province level . *** p<0.01, ** p<0.05, * p<0.1. Age class: the omitted benchmark is the age class below 30.

Table 8. Sensitivity of the POLARIZED effect to departures from the CIA assumption

Assumptions	p_{11}	p_{10}	p_{01}	p_{00}	$p_{1.}$	$p_{0.}$	S	d_0	d_1	Bias %	ATE	Selection effect (Odds)	Outcome Effect (Odds)	WSE
Confounders calibrated on observables														
Male	0.79	0.75	0.95	0.93	0.77	0.94	-0.17	0.04	0.02	-0.0857	0.19	0.226	1.505	0.025
Ageabmedian	0.82	0.82	0.41	0.32	0.82	0.36	0.46	0	0.09	0.2514	0.131	8.22	1.484	0.028
Early response	0.7	0.66	0.5	0.56	0.68	0.53	0.15	0.04	-0.06	-0.0514	0.184	1.906	0.793	0.022
Killer confounders														
	0.6	0.5	0.5	0.2	0.56	0.33	0.23	0.1	0.3	0.434	0.099	2.589	4.016	0.024
	0.7	0.5	0.5	0.2	0.62	0.33	0.29	0.2	0.3	0.549	0.079	3.344	4.023	0.025
	0.8	0.5	0.5	0.2	0.68	0.33	0.35	0.3	0.3	0.669	0.058	4.408	4.026	0.026
	0.6	0.4	0.5	0.2	0.52	0.33	0.19	0.2	0.3	0.366	0.111	2.221	4.056	0.024
	0.7	0.4	0.5	0.2	0.58	0.33	0.25	0.3	0.3	0.480	0.091	2.86	4.031	0.025
	0.8	0.4	0.5	0.2	0.64	0.33	0.31	0.4	0.3	0.600	0.07	3.692	4.045	0.026
	0.6	0.3	0.5	0.2	0.48	0.33	0.15	0.3	0.3	0.291	0.124	1.902	4.026	0.023
	0.7	0.3	0.5	0.2	0.54	0.33	0.21	0.4	0.3	0.406	0.104	2.426	4.043	0.024
	0.8	0.3	0.5	0.2	0.61	0.33	0.28	0.5	0.3	0.057	0.165	3.133	4.054	0.025
	0.6	0.2	0.5	0.2	0.44	0.33	0.11	0.4	0.3	0.217	0.137	1.625	4.044	0.023
Killer confounders	0.7	0.2	0.5	0.2	0.51	0.33	0.18	0.5	0.3	0.331	0.117	2.077	4.014	0.023
	0.8	0.2	0.5	0.2	0.57	0.33	0.24	0.6	0.3	0.446	0.097	2.653	4.046	0.024
	0.6	0.5	0.5	0.5	0.56	0.5	0.06	0.1	0	0	0.175	1.284	1	0.022
	0.7	0.5	0.5	0.5	0.62	0.5	0.12	0.2	0	0	0.175	1.656	1.004	0.022
	0.8	0.5	0.5	0.5	0.68	0.5	0.18	0.3	0	0	0.175	2.172	1.012	0.023
	0.6	0.5	0.5	0.4	0.56	0.44	0.12	0.1	0.1	0.063	0.164	1.612	1.503	0.022
	0.7	0.5	0.5	0.4	0.62	0.44	0.18	0.2	0.1	0.097	0.158	2.079	1.508	0.023
	0.8	0.5	0.5	0.4	0.68	0.44	0.24	0.3	0.1	0.137	0.151	2.733	1.516	0.023
	0.6	0.5	0.5	0.3	0.56	0.39	0.17	0.1	0.2	0.206	0.139	2.035	2.345	0.023
	0.7	0.5	0.5	0.3	0.62	0.39	0.23	0.2	0.2	0.274	0.127	2.618	2.34	0.024
	0.8	0.5	0.5	0.3	0.68	0.39	0.29	0.3	0.2	0.343	0.115	3.424	2.333	0.024

Ageabmedian: dummy taking value 1 if age of the respondent is above median. Bias % = (ATE baseline-ATE)/ATE baseline - NB: Baseline ATE (no confounders) = 0.175 (WSE:.022, t-stat 8.01). $d_1 = p_{11} - p_{10}$ (outcome effect of U for the treated); $d_0 = p_{01} - p_{00}$ (outcome effect of U for the controls); $s = p_1 - p_0$ (effect of U on the selection into treatment). Selection effect (odds) = $\dfrac{\dfrac{Pr(T=1|U=1,W)}{Pr(T=0|U=1,W)}}{\dfrac{Pr(T=1|U=0,W)}{Pr(T=0|U=0,W)}}$;

Outcome Effect (odds) = $\dfrac{\dfrac{Pr(Y=1|T=0,U=1,W)}{Pr(Y=0|T=0,U=1,W)}}{\dfrac{Pr(Y=1|T=0,U=0,W)}{Pr(Y=0|T=0,U=0,W)}}$ *T* and *W* being the treatment indicator and the observable set of covariates respectively.WSE = "within-imputation standard errors". For further details see Ichino et al., (2006).

Appendix C

Table C.1 Trustor giving (ordered probit estimate)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.0162	0.139***	0.0230	0.0287	0.139***	0.136**	0.144***
	(0.0540)	(0.0528)	(0.0536)	(0.0601)	(0.0528)	(0.0573)	(0.0526)
30-40 age class	0.167*	0.149	0.168*	0.178*	0.141	0.141	0.146
	(0.0872)	(0.0942)	(0.0889)	(0.0931)	(0.0961)	(0.101)	(0.0962)
40-50 age class	0.259***	0.208***	0.262***	0.279***	0.202***	0.215***	0.198***
	(0.0671)	(0.0655)	(0.0654)	(0.0674)	(0.0654)	(0.0684)	(0.0643)
50-60 age class	0.221***	0.0894	0.225***	0.231***	0.0869	0.0801	0.0809
	(0.0718)	(0.0778)	(0.0714)	(0.0735)	(0.0776)	(0.0824)	(0.0782)
60-70 age class	0.181*	0.0533	0.179*	0.174*	0.0500	0.0389	0.0417
	(0.0926)	(0.0903)	(0.0938)	(0.0949)	(0.0921)	(0.0933)	(0.0902)
70-80 age class	-0.0421	-0.274*	-0.0429	-0.0523	-0.264*	-0.279*	-0.277*
	(0.135)	(0.149)	(0.135)	(0.136)	(0.149)	(0.150)	(0.151)
Above 80 age class	0.0533	-0.103	0.0580	-0.0174	-0.102	-0.135	-0.129
	(0.400)	(0.275)	(0.401)	(0.441)	(0.264)	(0.296)	(0.266)
Bridge	0.108**	0.265***	0.122**	0.130**	0.269***	0.269***	0.261***
	(0.0546)	(0.0512)	(0.0567)	(0.0583)	(0.0523)	(0.0550)	(0.0511)
Early response			-0.0419	-0.0323	0.0180	0.0234	0.0197
			(0.0407)	(0.0431)	(0.0453)	(0.0480)	(0.0450)
Risk aversion					-0.0147	-0.0173	-0.0152
					(0.0140)	(0.0142)	(0.0143)
Dictator giving					0.0185***	0.0189***	0.0184***
					(0.000956)	(0.00106)	(0.000944)
Above Intermediate Education							0.00160
							(0.00174)
Donations							0.00423
							(0.00424)
Social cooperatives							0.00223**
							(0.000938)
Province dummies	NO	NO	NO	YES	NO	YES	NO
Region dummies	NO	NO	YES	NO	YES	NO	NO
			CUT 1				
Constant	-0.417***	-0.139	-0.326***	-0.315***	-0.0860	-0.103	0.0575
	(0.0715)	(0.112)	(0.0698)	(0.0719)	(0.114)	(0.116)	(0.186)
			CUT 2				
Constant	-0.200***	0.110	-0.109*	-0.0939	0.164	0.152	0.308*
	(0.0686)	(0.112)	(0.0662)	(0.0686)	(0.112)	(0.114)	(0.185)
			CUT 3				
Constant	-0.0437	0.292***	0.0479	0.0664	0.346***	0.338***	0.489***
	(0.0665)	(0.113)	(0.0633)	(0.0658)	(0.112)	(0.115)	(0.185)
			CUT 4				
Constant	0.157**	0.523***	0.249***	0.272***	0.578***	0.575***	0.721***
	(0.0670)	(0.116)	(0.0648)	(0.0668)	(0.115)	(0.118)	(0.188)
			CUT 5				
Constant	0.235***	0.613***	0.327***	0.351***	0.668***	0.666***	0.811***
	(0.0682)	(0.120)	(0.0660)	(0.0681)	(0.118)	(0.121)	(0.191)

			CUT 6				
Constant	0.768***	1.223***	0.862***	0.895***	1.281***	1.290***	1.418***
	(0.0670)	(0.120)	(0.0641)	(0.0660)	(0.117)	(0.120)	(0.191)
			CUT 7				
Constant	0.818***	1.281***	0.913***	0.947***	1.339***	1.349***	1.476***
	(0.0669)	(0.121)	(0.0633)	(0.0653)	(0.117)	(0.120)	(0.192)
			CUT 8				
Constant	0.870***	1.339***	0.965***	1.000***	1.397***	1.409***	1.535***
	(0.0678)	(0.121)	(0.0641)	(0.0659)	(0.116)	(0.118)	(0.191)
			CUT 9				
Constant	0.912***	1.386***	1.007***	1.043***	1.445***	1.457***	1.582***
	(0.0669)	(0.122)	(0.0624)	(0.0642)	(0.116)	(0.118)	(0.188)
			CUT 10				
Constant	0.933***	1.409***	1.028***	1.064***	1.467***	1.480***	1.604***
	(0.0671)	(0.120)	(0.0633)	(0.0646)	(0.115)	(0.118)	(0.187)
Observations	2,238	2,238	2,238	2,238	2,238	2,238	2,231