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ABSTRACT

Eliciting Motives for Trust and Reciprocity by Attitudinal and Behavioural Measures

Value Surveys may reveal well-behaved societies by the statistical treatment of the agents' declarations of compliance with social values. Similarly, the results of experiments conducted on games with conflict of interest trace back to two important primitives of social capital – trust and reciprocity – which can be used to explain deviations from the Nash equilibrium and which lead to the optimal cooperative outcome. In this paper we attempt to elicit the true motive(s) underlying the behaviour of players in experimental trust and dictator games and suggest that the most informative utilization of surveys in this regard goes beyond the simple comparison of answers to a questionnaire with actual behaviour. Specifically the paper uses descriptive statistics and ordered probit models to analyse whether, and to what extent, answers to a questionnaire about attitudes to trusting and reciprocating predict subjects' behaviour and, by comparing behaviour in Trust and Dictator Game, disentangles the strategic and altruistic motivations. We find no simple or direct correlation between behavioural trust or trustworthiness and attitudinal trust or disposition to reciprocate. However, dividing subjects according to attitudinal trust and trustworthiness, we observe that the link between the questionnaire and experimental sessions is more subtle than the mere correlation between average attitudes and average behaviours. The information conveyed by a survey appears to be much more powerful *ex post* – once the two motivational components have been separated out.

JEL Classification: C72, C91, D63, D64

Keywords: trust, reciprocity, experimental economics, ordered probit

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“Suit the action to the word, the word to the action,”

(Shakespeare, 1601, Hamlet Act 3, Scene 2).

1. Introduction

Value Surveys may reveal well-behaved societies by the statistical treatment of the agents' declarations of compliance with social values. Similarly, the results of experiments conducted on games with conflict of interest trace back to two important primitives of social capital - trust and reciprocity – which can be used to explain deviations from the Nash equilibrium and which lead to the optimal cooperative outcome. The main difference between experiments performed in Behavioural Economics *vis-à-vis* survey based information arises from the fact that the latter consist of each agent's self-evaluation of his trusting attitude as a person and of being trustworthy as a participant in his social environment, while the former directly identify the two (or more) players' behaviour in a social interaction. When comparing results stemming from these two empirical research methods, this asymmetry, arising from the lack of a strategic setting in the former and its presence in the latter, has to be carefully tackled. Indeed, “social capital (...) is embodied in the *relations* among persons” (Coleman, 1990, p.304; italics in the text).

In strategic settings, significant questions await an answer. To what extent does individual behaviour, shaped by trust and reciprocity, depart from strict self-interest? Do trust and reciprocity orient the relations among persons towards the strategic reasoning which is needed to mutually improve on the respective pay-offs, or do they trump any strategic reasoning and draw out from the individual his other-regarding (social) preferences? (Farina and Sbriglia, 2008).

In experiments conducted on the Trust Game the behaviour of players often deviates from the Nash solution of the first mover sending nothing. The sender neglects the sub-game perfect strategy profile and sends a positive amount, and the respondent renounces his dominant strategy and sends back a positive amount. In the literature this violation of orthodox rational choice has mostly been explained by evidence testifying to the presence of other-regarding (social) preferences. The suggested rationale is that the social relations in which the two players are involved embed a disposition to trust by the sender and the expectation of trustworthy behaviour by the respondent. When each player's behaviour conforms to altruism the maximization of the utility function of the two players depends on the sum of their respective payoffs (Rabin, 1993); when behaviour reflects inequality aversion it involves the minimization of the distance between their respective payoffs (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). Still, we are convinced that this is by no means the full story. To sustain our doubts, the typical example is the sequential Prisoner's Dilemma (PD), where it is difficult to tell whether cooperative behaviour is the effect of reciprocity

or of altruism. Therefore, the motivation for trusting and/or reciprocating behaviour delivering the cooperative solution in one-shot games with conflict of interest deserves a more comprehensive investigation.

In the literature, following the seminal paper in which Glaeser et al. (2000) analysed measures of self-reported trust and trustworthiness (answers to questionnaires such as the World Value Survey (WVS) and the European Social Values (ESV)), the question has been posed as to what extent there could be a connection between attitudes to trust and trustworthiness and actual behaviour observed in laboratory experiments.¹ The correlation between a disposition towards trust and reciprocation declared in the questionnaire of the World Value Survey (WVS) or the European Value Survey (EVS) and the findings of experiments testing the actual behaviour in Trust Games is currently the subject of debate. Attitudinal survey questions as reported in the EVS are often regarded as inefficient indicators of trust, since they lack the behavioural underpinnings (Putnam, 1995) that one might desire when measuring trust. The empirical analyses which have been undertaken to date are still a long way from producing a set of consistent results. Glaeser et al. (2000), the first analysis to compare attitudinal and behavioural evidence stemming from experiments, report that attitudinal survey questions do not predict trusting behaviour by senders in experiments; on the contrary, in their study answers to the WVS questionnaire appear to be correlated to respondents' behaviour, thus suggesting that the attitudinal measure is related not to trust but to trustworthiness. Lazzarini et al. (2005) presents similar experimental evidence. Sapienza et al. (2007) find a correlation between the senders' actual behaviour in the experiment and their expected trustworthiness, that is each sender's declared beliefs about the amount the respondent is willing to return. On the other hand, no correlation between senders' actual behaviour and attitudinal trust or expected trustworthiness was found by Fehr et al. (2003), who suggest that to some extent attitudinal trust predicts behavioural trust. A natural candidate for the explanation of diverging results is the variety of the experimental settings. For instance, Sapienza et al. (2007) notice the peculiarity of the Fehr et al. (2003) experimental evidence, where heterogeneity across German households as players in the TG impedes the trustor from identifying himself with the trustee, thus causing a deviation of the experimental evidence from the WVS's attitudinal evidence.

However, many papers (most notably Charness and Rabin, 2005 and Cox, 2004) have lamented the lack of a clear distinction between behavioural trust and reciprocity manifested by, respectively, the first and second movers in Trust Game experiments. Indeed, the players' intentions are revealed by

¹ It was contended that the degree of trustworthiness of the social context in which individuals operate may interfere with individuals' trust. The most frequent criticisms are: (i) the tendency to set up an hypothetical situation in responding to a questionnaire could lead the subject to underlook possible threats just because he does not find himself in a real setting; (ii) the tendency to self-idealisation, so that the subject may overestimate his standing in terms of moral values; (iii) the lack of a gain may induce the subject to give loose answers (see, for instance, Ciriolo, 2007).

the matrix of the monetary payoffs and their distribution, as happens in the accounts of trust and reciprocity in which only the distributive outcome matters (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999). However, two different designs of the Trust Game in extensive form may elicit two different motives. If an outside option is inserted in the extensive form, a first mover who discards the Nash play and sends a certain amount to the second player makes a “voluntary” choice of “investing” in the relationship, while the first player’s choice in the traditional design can be labelled “involuntary” (McCabe, et al., 2003). Similarly to the first mover of the Rosenthal’s (1981) Centipede, the trustor reveals the intention to bear a risk (of getting a payoff which is lower than the outside option) and the trustee may then be moved by a sentiment of reciprocation (and also of gratefulness, as his self-esteem is strengthened by the other player’s recognition of his trustworthiness).

The “outside option” example shows that the intention to “invest” in the Trust Game in extensive form revealed by a move could conceal different motivations. Whether the motive underlying the behaviour manifested by the first mover is the desire to invest in a relationship of mutual advantage with the trustee or the desire to be good to him independently from his own final payoff, remains an unsettled question. We think that research efforts should concentrate on identifying the motive which is actually at work, out of the two possible motives embedded in the trust game: 1) an “investment” motive - conditional cooperation is a way to express the expectation of reciprocal behaviour; and/or, 2) an altruistic motive - what may appear as an “investment” actually conceals a social preference, that is the intention to gratuitously favour the other player.

In this paper we attempt to elicit the true motive(s) underlying the behaviour of each of the two players and suggest that the most informative utilization of surveys in this regard goes beyond the simple comparison of answers to a questionnaire with actual behaviour. The statistical analysis of the relation between players’ behaviour in the sessions and their declared attitudes to trust, allows a deeper understanding of the players’ behaviour and a better evaluation of the experimental results. The objective of disentangling the strategic motive (the intention of the trustor to elicit benevolence from the trustee, and the trustee interest in reciprocating) from the altruistic motive is pursued by evaluating the correlation between attitudinal and behavioural measures of trust and trustworthiness. We thus employ the “words” of answers to a questionnaire in order to better understand the motivations underlying “actions”.

2. The standard Trust Game experimental design

The first question we address here is the replication, in an Italian environment, of a similar experimental design to that implemented by Glaeser et al. (2000) for the United States and Lazzarini et al. (2005) for Brazil, in order to test the relationship between two players' behaviour and their questionnaire answers. These sessions were conducted in Siena and Salerno, in May and July 2007. Overall, 168 students participated in the sessions of this first part of the experiment.

All sessions were divided into two different stages. In the first stage, the subjects were asked to fill in a questionnaire in which some of the EVS questions were reproduced. In addition to basic information on the characteristics of subjects, we asked all subjects - those who played as senders and those who played as respondents - to answer both the standard questions from the World Values Survey eliciting the general level of trust of the subject ("Generally speaking, would you say that most people can be trusted, or that you can never be too careful when dealing with others?" (v47), and "Do you think that most people would try to take advantage of you..." (v23)), as well as some more specific questions (is it ever justified, to not pay taxes, to tell lies, to not pay for your ticket on the bus), eliciting the opinion of the subject about compliance with civic values. The Appendix reports the complete set of trust/trustworthiness questions that appeared on the students' computer screens.

The rationale of our selection of WVS questions is to make the questionnaire gather information on what may be called the subject's degree of trust (the disposition to be trusting) and trustworthiness (the disposition to be trustworthy and then inclined to reciprocate). Recalling the "multiple self" put forward by Elster (1986), these two attitudes can be traced back to the two selves of a subject: (i) his personal self expresses his degree of trust and consists of his personal opinion about the degree to which people in their environment and/or political institutions could be trusted; (ii) his social self expresses his degree of trustworthiness and consists of the civic values he tends to comply (or not comply) with as an individual in a social environment. Indeed, just as the subject's self-reported degree of trust should be reflected by his actual behaviour, his evaluation of the degree of trustworthiness that a particular social situation merited can be taken as a proxy for the degree to which he could be considered trustworthy and thus as a proxy of his disposition to reciprocate. To what extent the personal and the social selves are connected within each subject, so that subjects sitting in experimental sessions show a behaviour which is coherent with their declared attitudes is one of the questions investigated here.

As for the second stage, as in previous analyses of behavioural trust, we adopted the experimental setting of the Trust (Investment) Game (Berg *et al.* 1995). This game involves a bargaining context

in which two players (Senders and Respondents) decide how to share a well defined amount of money². At the first step, Senders make an investment decision transferring a certain number of experimental tokens to Respondents. The number of tokens is then tripled by the experimenter, so that Respondents receive three times the amount of tokens initially sent. At the second step, Respondents decide how many tokens to return to Senders. The standard design was adopted, in as much as subjects were randomly divided into two groups (Respondents and Senders) once they had completed the questionnaire, and then the game was played according to the rules described above.

There are two main differences between our work and those of Glaeser *et al*, 2000 and Lazzarini *et al*, 2005. First, we set the multiplying factor – α – equal to 3, as in the original design by Berg *et al*. (1995), rather than 2, as in the two above mentioned papers. The reason is that the higher value of α coefficient places a high weight on trustworthiness, which can then be better monitored. Second, in contrast to Lazzarini *et al*. (2005), where subjects were playing in face-to-face interactions, we adopted a double-blind anonymous partnership protocol: Senders and Respondents were selected randomly and anonymously by the computer and no personal communication was allowed during the sessions.³ The purpose here was to prevent any existing social ties or prior information sharing by subjects from affecting the results. We thus attempted to minimise disturbances due to the interplay between attitudes resulting from particular cultural values and behaviour induced by the specific experimental setting in order to preserve comparison with Trust Game experiments conducted in very different cultural and social environments such as the United States and Brazil. All these features of the experimental design were used in both Model 1 and Model 2. An additional feature was introduced in Model 2, whereby not only the first but also the second mover was endowed with 10 tokens.

3. Model 1. A comparison between attitudinal and behavioural measures

Table 1 presents the results of estimating Model 1: Ordered Probit regressions connecting behaviour in the Trust Game to answers to questions concerning each agent's self-evaluation of his trusting attitude as a person and of being trustworthy as a participant in his social environment. More specifically, we test: (i) the correlation between the Sender's trust EVS questions (his own personal characteristics and opinion in evaluating institutions) and his behavioural trust measure (the amount

² The Sender initial endowment was equal to 10 experimental tokens. The experimental exchange rate was set to 0.1 Euro cent for each token. Payoffs varied between 6 and 10 Euro per subjects. Details of the payoff structure were illustrated in the Instruction sheet.

³ In Glaeser *et al.*, 2000, friends were allowed to participate in the same trust game. The effect of friendship or, more generally, of a previous social relationship on trusting behaviour was however unclear.

sent); (ii) the correlation between the Respondent’s EVS trustworthiness questions and his behavioural trustworthiness (the amount sent back).

Table 1: Model 1 Ordered Probit model of amounts sent and sent back

	Senders: Tokens sent				Recipients: Tokens sentback			
	Full model		Only V47		Full model		Only V47	
	Coef.	. z	Coef.	. z	Coef.	. z	Coef.	. z
Tokens sent	-	-	-	-	0.62	8.09	0.56	9.07
salerno	0.32	1.03	0.35	1.29	0.08	0.23	0.13	0.49
Female	-0.14	-0.49	-0.64	-2.79	0.19	0.62	0.23	0.96
age	2.35	1.70	1.89	1.52	-1.89	-1.19	-0.17	-0.14
Mid to high income family	-0.11	-0.31	-0.08	-0.30	0.32	0.82	0.22	0.73
Economics student	-0.04	-0.15	-0.06	-0.26	-0.36	-1.14	-0.49	-2.02
Mother has secondary or tertiary education	0.21	0.81	0.20	0.91	0.36	1.24	0.39	1.62
Index of trust (v47)	0.37	1.65	0.48	2.64	-0.71	-2.24	-0.31	-1.36
Trust the family	0.38	1.06	-	-	0.45	0.97	-	-
Trust people you know	0.31	0.69	-	-	-0.63	-1.50	-	-
Trust new acquaintances	0.24	0.61	-	-	0.36	0.87	-	-
Trust immigrants	0.02	0.07	-	-	0.45	1.16	-	-
Trust the government	-0.10	-0.28	-	-	-0.21	-0.55	-	-
Trust Parliament	-0.27	-0.74	-	-	-0.50	-1.36	-	-
Trust Political Parties	0.98	1.88	-	-	0.58	1.23	-	-
Trust Public Officials	-0.23	-0.71	-	-	0.21	0.54	-	-
<i>It is Justified to: (1=never; 10 = always)</i>								
Try to obtain State benefits illicitly	-0.23	-1.27	-	-	-0.30	-1.43	-	-
Evade taxes	0.15	0.62	-	-	0.37	1.79	-	-
Drive someone else's car without their permission	0.47	2.40	-	-	-0.09	-0.44	-	-
Tell lies in one's own interests	0.39	2.05	-	-	0.39	1.93	-	-
for someone to have an extra marital affair	-0.03	-0.21	-	-	0.15	0.80	-	-
Accept illegal payments (bribes)	0.09	0.40	-	-	0.04	0.20	-	-
Use moonlighters - to avoid taxes	-0.22	-0.88	-	-	-0.06	-0.27	-	-
Ride on the buses without paying	-0.16	-0.85	-	-	-0.48	-2.21	-	-
n	91		92		83		88	
Pseudo R-Squared	0.10		0.05		0.29		0.25	

note: coefficients which are significant at $.05 < p < .10$ are indicated in *italics*, coefficients which are significant at $p < .05$ are indicated in **bold**.

Answers to the “Trust question” (v47) has a positive and statistically significant impact on the amount sent by Senders. As for Respondents, the negative sign on the coefficient is statistically significant at 5% in the full specification however the economic meaning, is, to say the least, a little strange, as it would imply that the more he trusts, the less he sends back.

As for the other questions, the Senders manifest a sort of “manipulative behaviour”, as the higher their score on questions such as it being justified to lie in one’s own interests or to take a friend’s car without permission, etc., show a moral acceptance of cheating, the more they send. On the other hand, the more Respondents demonstrate a moral acceptance of lack of civic values and, in particular, literally free-riding behaviour (i.e. to travel on the bus without ticket), the less money they send back. The implication is that both Senders and Respondents are eager to take advantage

of an opponent's positive attitude in order to make business, even in spite of their tendency to downplay anti-civic behaviour as reported by the declared opinions "about the others". On the one hand, the first disregards any moral evaluation of the second mover since the lower is the latter's moral intransigence the more he invests. A plausible reason is the expectation that the disposition to cooperate in a strategic interaction is not reduced, but possibly magnified, by proneness to collusive behaviour as shown by the subjects' answers as second movers. On the other hand, the second player appears to be encouraged to put in place a "saving behaviour" (he may think: "the less you send me, the less you deserve me to be sent you back"), which we can consider a social disposition towards the punishment of free-riders but at a personal benefit.

We decided to initiate our research work by replicating the Glaeser's experiment assessing the extent to which attitudinal measures predict behavioural measures of trust and trustworthiness. In contrast to Glaeser et al. (2000) we find no correlation between attitudinal trust and behavioural trustworthiness and in contrast to Sapienza et al. (2007) we find no correlation between attitudinal trust and expected trustworthiness. Similarly to Fehr et al.(2003), attitudinal trust appears to be moderately correlated with behavioural trust. We may say that our replication in Model 1 of the standard Trust Game experimental design, in order to test the relationship between the two players' behaviour and the questionnaire answers by Ordered Probit, has produced opaque results. All in all, the presumption that answers to a survey predict behaviour in laboratory experiments is then initially rejected.

4. Model 2. Searching for the real motive underlying behavioural trust and reciprocity

One possible reason for the “unsatisfactory” results in terms of the lack of relation between attitudinal and behavioural measures of trust and trustworthiness lies in the ambiguity embedded in the experimental setting. In replicating for the Italian environment a similar experimental design to that implemented by Glaeser et al. (2000) for the United States and Lazzarini et al. (2005) for Brazil we have not yet addressed the issue we raised presented in the introduction: the need to disentangle the real motivations from the two possible ones – the “strategic investment” or the “altruistic” motives - of players’ behaviour in Trust Game experiments.

An experimental design in which positive reciprocal behaviour responding to a generous action is neatly separated out from other-regarding (social) preferences has been constructed by Cox (2004). Cox modified the well-known investment game by Berg, Dickhaut and McCabe (1995) in order to obtain information on whether it is the “trust/reciprocity” motive or the “social preferences” motive which underlies players’ behaviour. We drew on the ‘Cox’ experimental design to conduct a second set of experimental sessions in December 2007, the subjects being undergraduate students at the University of Siena. The students were randomly divided in two groups (Senders and Respondents, respectively), and each of them was denoted by the number of the computer and the number of the session in which he seated. As before, and in contrast to Glaeser et al. (2000) and Lazzarini et al. (2005), the double-blind procedure, that is anonymity with respect to both the other player and the experimenter, was insured.⁴

The so-called “triadic” design by Cox comprises three treatments: 1) a Trust (Investment) Game (TG), in which both the senders and the Respondents were endowed with ten tokens (the rate of change was 1 token = €1); the trustees had to decide whether to send back some, all, or part of his endowment; 2) a Dictator Game (DG1), in which the trustor has to decide whether to send or not to send (all, or part of) his endowment to the other player - in the Instructions, both players were informed that the sender would by no means have had the opportunity to interact with the other player, as this latter player had to remain passive; and, 3) a modified Dictator Game (DG2), in which a second mover acting as Respondent had to send back or not to send back (all, or part of) the amount that he has received by a first-mover acting as sender⁵, which the experimenter had multiplied by three. In the Instructions for DG2, the Respondent is made aware that the amount received was sent not by his opponent in the game he was playing, but by another unknown player

⁴ In the IMBE Conference held Alicante in March 2008, where a shorter version of this paper was presented, another paper dealing with attitudinal and behavioural measures of trust and trustworthiness was delivered (see in the references Capra et al., 2008). However, no comparison can be made, as the design of this paper does not use the double-blind procedure and the same subjects participate in all games.

⁵ Which could of course also be zero.

whom he would not have had the opportunity to interact with.⁶ The 194 students involved in our experiment, slightly more than those involved in the original Cox experiment, formed 33 pairs in the first two treatments and 31 pairs in the last one. In order to preserve independence in behaviour, each subject participated in only one session.

The subjects were also asked to fill out the same questionnaire used in Model 1. Coherently with the arguments presented in section 2, we do not follow Cox (2004) in differentiating questions between the two groups of players. In fact, we do not think it appropriate to distinguish between the opinion of the subject when he is playing as a Sender and when he is playing as a Respondent. The elicitation of trustors' opinions about the others' degree of trustworthiness (in addition to information on their degree of trust) allows us to deepen our understanding about the motives underlying the "high" or "low" amount the trustors sent. Similarly, to elicit trustees' attitudes to trust (in addition to information on their degree of trustworthiness) allows us to deepen our understanding about the motives underlying the "high" or "low" amount the trustees returned. As will be understood from the following, the attitudinal evidence about both trust and trustworthiness can be instrumental in separating out different motivations stemming from the behavioural evidence.

⁶ All Instructions sheets are available at request from the corresponding author.

Table 2: Model 2 Ordered Probit ‘Cox’ model of amounts sent and sent back

	Senders: Tokens sent				Recipients: Tokens sentback			
	Full model		Only V47		Full model		Only V47	
Tokens sent	-	-	-	-	0.34	4.73	0.24	3.90
DG1	-0.18	-0.58	-0.23	-0.89	-0.51	-1.67	-0.10	-0.35
Female	-0.57	-1.52	-0.37	-1.19	-0.33	-0.89	0.05	0.20
age	-7.78	-3.45	-5.38	-2.83	-4.94	-1.97	-4.18	-2.06
Mid to high income family	-0.46	-1.39	0.06	0.23	0.07	0.22	0.20	0.76
Economics student	-1.46	-2.50	-0.73	-1.47	-1.11	-1.76	-0.59	-1.14
Mother has secondary or tertiary education	-0.27	-0.81	-0.45	-1.66	-0.04	-0.12	-0.02	-0.06
Index of trust (v47)	-0.44	-1.17	0.00	-0.01	-0.13	-0.44	0.05	0.20
Trust the family	0.89	1.74	-	-	-0.11	-0.26	-	-
Trust people you know	0.57	1.26	-	-	0.23	0.41	-	-
Trust new acquaintances	1.09	2.22	-	-	0.49	0.96	-	-
Trust immigrants	-0.63	-1.79	-	-	-0.43	-0.93	-	-
Trust the government	0.40	0.97	-	-	-0.33	-0.76	-	-
Trust Parliament	0.38	0.94	-	-	0.85	1.79	-	-
Trust Political Parties	-0.54	-1.34	-	-	0.50	0.66	-	-
Trust Public Officials	0.24	0.74	-	-	-0.57	-1.24	-	-
<i>It is Justified to: (1=never; 10 = always)</i>								
Try to obtain State benefits illicitly	0.10	0.33	-	-	0.28	1.12	-	-
Evade taxes	-0.14	-0.41	-	-	0.09	0.37	-	-
Drive someone else's car without their permi	0.60	2.47	-	-	0.19	0.78	-	-
Tell lies in one's own interests	0.09	0.29	-	-	0.44	1.32	-	-
for someone to have an extra marital affair	0.10	0.49	-	-	0.41	1.87	-	-
Accept illegal payments (bribes)	0.13	0.52	-	-	-0.51	-1.98	-	-
Use moonlighters - to avoid taxes	0.01	0.03	-	-	-0.33	-1.02	-	-
Ride on the buses without paying	-0.25	-0.85	-	-	-0.46	-1.81	-	-
n	66		66		66		66	
Pseudo R-Squared	0.13		0.05		0.12		0.05	

note: coefficients which are significant at $.05 < p < .10$ are indicated in *italics*, coefficients which are significant at $p < .05$ are indicated in **bold**.

In Model 2 (see Table 2), the correlation between the general trust question (v47) and the amount sent and returned has a negative sign - for trusting participants there is even less tendency than in Model 1 to send or send back more than others. The effect of personal characteristics is in this case somewhat stronger than before although, for the most part, the results are consistent across the two experiments – women and older people tend to send back less as do economics students⁷. In general, questions dealing with the subject’s opinion about the others’ civic values perform similarly to results in Model 1.

When individuals are ranked according to the amounts sent and received back in each treatment, we are in the position to disentangle the individuals’ disposition towards trust and reciprocity by comparing the behaviour determined by social preferences in the non-strategic interaction of treatments 2 and 3 with the strategic setting in which the two players are posited in the TG. The

⁷ The main exception here is age which for Senders in Model one had a positive and weakly statistically significant coefficient in Model 1.

sender's strategic behaviour in the TG results from the comparison of the amount sent by the trustor in the TG with the other-regarding preferences exhibited by the analogous player in the DG1 setting free from strategic considerations (figures 1 & 2). Similarly, a measure of the respondent's reciprocating behaviour results from the comparison between the respondent's strategic behaviour in the TG and the other-regarding preferences exhibited by the analogous player in the DG2 setting free from strategic considerations (figure 2).

Figure 1: Amounts sent, 'Cox' type TG design, paired players

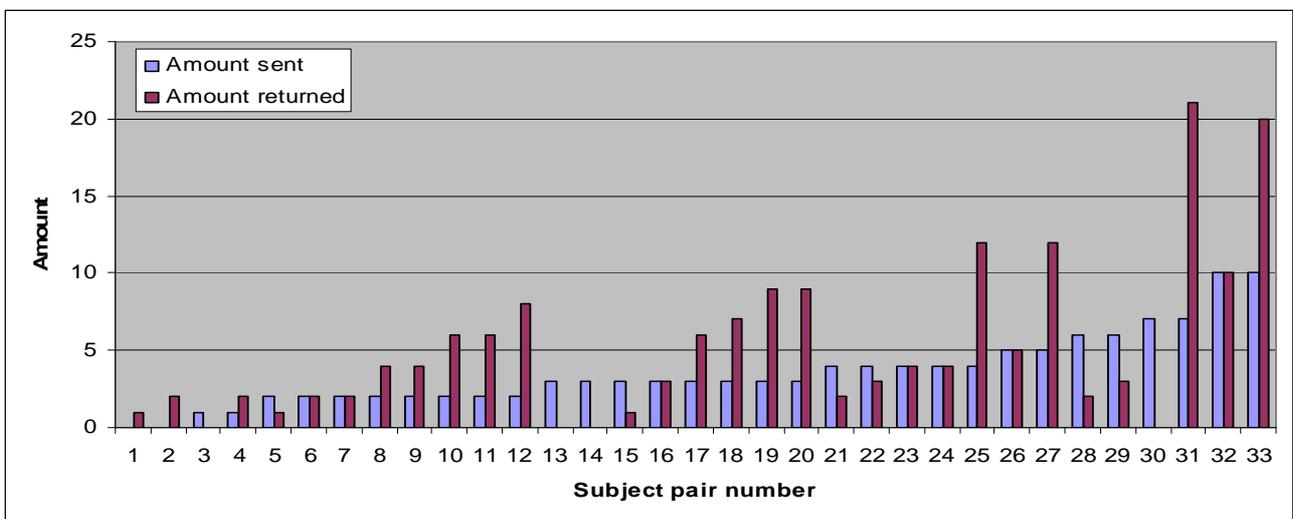


Figure 2: Amounts sent, 'Cox' type TG and DG1 designs, frequencies

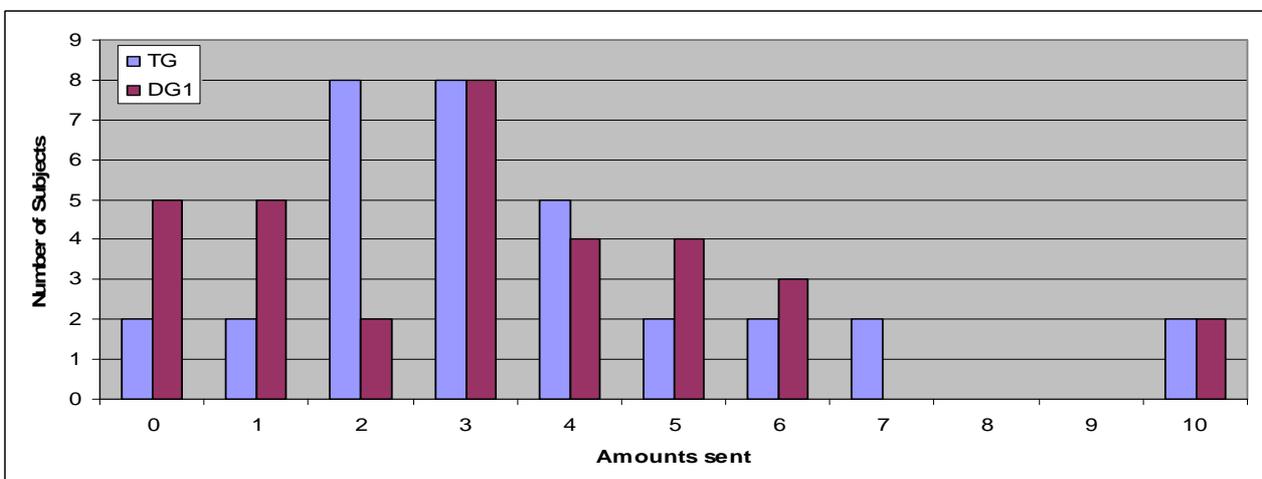
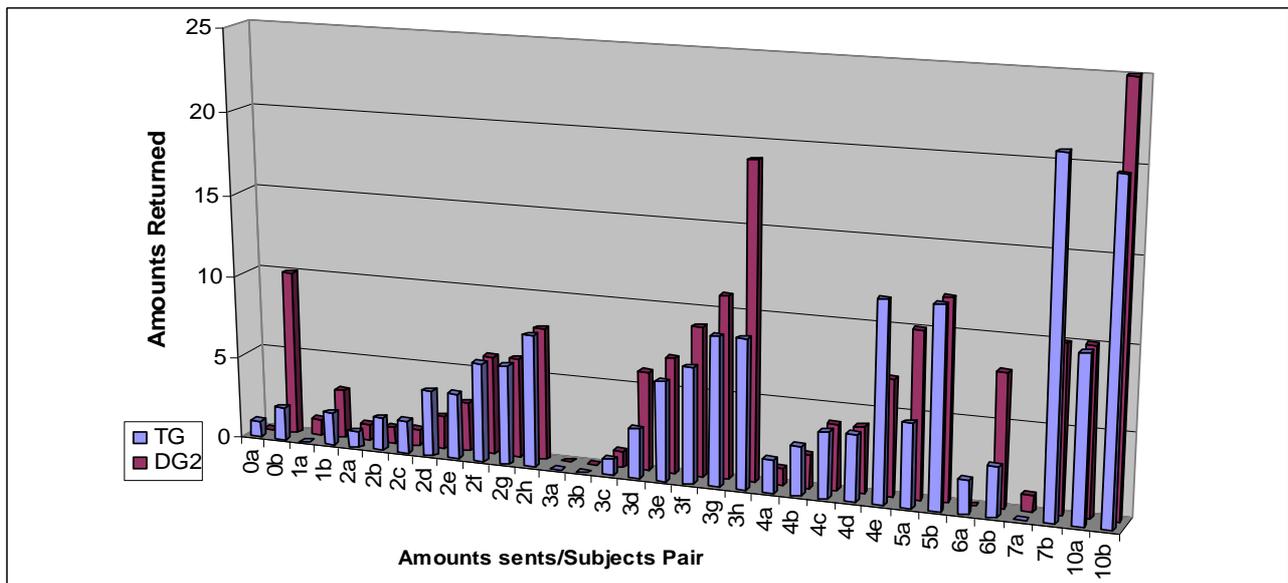


Figure 3: Amounts returned ‘Cox’ type TG and DG2 designs, by paired players



The comparison of the results of the TG with the DG1 ones allows us to infer a measure of the sender’s possible trusting behaviour (figure 1). On average, the amount sent in the TG is greater than the amount sent in the DG1 (figure 2), and the amount sent back in the TG is lower than the amount sent in the DG2 (figure 3). In the latter figure, the blue bars show the amount sent back in the TG and the red bars show the amount sent back in the DG2. In general, the subjects playing as first movers send amounts lower than in the experimental sessions performed by Cox (see Table 4). On the one hand, in contrast to Cox’s results the amount sent by the trustor is positive in almost all cases (the ratio of a positive amount sent is 31/33 *vis-à-vis* 26/32), and a zero amount sent is much less frequent than in the Cox experiment (we obtain a zero return two times in TG and five times in DG1 *vis-à-vis* 6 in TG and 11 in DG1 in the Cox sessions). On the other hand, compared to the Cox sessions the frequencies of players in the TG are much higher at small as opposed to large amounts sent (the number of first movers who send less than 5 tokens is 23 *vis-à-vis* 4; the number of first movers who send all the 10 tokens is only 2 *vis-à-vis* 13). As for the second movers, while a zero return occurs only 4 times *vis-à-vis* 9 times in Cox’s experiment, the trustee send back on average a lower amount than in the Cox sessions. Considering the low amount sent on average by the trustees, this result is probably also a consequence of a scant disposition to reciprocate. We will return to this argument below.

Overall, by comparing the TG and the DG1 and the TG and the DG2, respectively, the inclination towards strategic reasoning stands out more clearly in our experiment than in Cox's one. As for senders, in common with Cox we find that the amount sent in TG is in excess with respect to DG1, but on average with lower values than in his experiment (the mean amount sent in our experiment was \$3.58 in the TG and \$3.24 in the DG1, whereas it was \$5.97 in TG and \$3.63 in the Cox's experiment). As for respondents, the same result applies, as the average amount returned in our experiment was \$1.50 and \$1.64, compared to \$4.94 and \$2.06, respectively, in Cox's one. These differences can be tested more rigorously. Following Cox (2004), we implement a test to statistically distinguish between the amounts sent in trust and dictator games. Formally, the general structure of the model estimated is:

$$R_i = \alpha + \beta D_i S_i + \gamma S_i + \varepsilon_i$$

Where R_i is the amount sent back, S_i the amount received by the recipient and D_i is a dummy taking the value of 1 for the trust game participants. The coefficients β and γ provide the means to distinguish between reciprocation and 'other-regarding' preferences. Since, as noted above, in the (modified) dictator game (DG2) there can be no reciprocating motive, the difference between the reaction of respondents to the amount sent in the two settings ($D=0$ and $D=1$) is a measure of pure reciprocity, specifically, the β coefficient.

As to the specific technique employed for the estimation, as above, we prefer an ordered probit model to implement the test rather than the two-limit tobit model with heteroskedasticity correction used by Cox. It is true that the amounts to be sent back are bounded but this doesn't seem to us to

Table 3: Ordered probit model of 'Cox' type test of difference in amounts sentback in trust and dictator games.

Cox Test	2nd experiment		1st & 2nd experiment	
	Coef.	z	Coef.	z
	-----	-----	-----	-----
Beta	-0.01	-0.23	-0.04	-0.81
Gamma	0.21	3.28	0.35	6.33
n	66		158	
R-sq	0.04		0.09	

be the significant issue in the econometrics here. The ordered probit model does not impose a priori that the marginal effects in the model are constant across amounts sent back. Moreover, as is well known, the implementation of a parametric heteroskedasticity correction term as in Cox (2004) is subject to the objection that the ‘correction’ is actually picking up a substantive effect (see, for example, Davidson & MacKinnon, 1986). Our results (reported in Table 4 below) show that there is no statistical distinction to be made between trust and dictator games in terms of the amounts sent back. In contrast to Cox’s results, the amount sent back is positive and statistically significant – for both trust and dictator games. However, the estimated effect of the amounts sent (γ) increases when observations from the earlier trust experiment are added. Once the strategic setting of the DG1 treatment is considered along with the disposition to reciprocate in the absence of the sender’s behaviour of the DG2 treatment, the correlation between amount sent and amount sent back shows an impressive improvement. This is a hint that different motivations are at the origin of the different behavioural choices expressed in different game settings. To deepen our understanding of this question, the utilization of the statistical analysis of the information conveyed by the questionnaire, in the evaluation of the trustors’ and of the trustees’ behaviour, may provide further insight into what is actually going on. The following section takes this up, with the aim of identifying subjects’ underlying motives by matching their self-declared attitudes with their behaviour.

5. Using attitudinal measures to control for motivation

In this section we put together behavioural and attitudinal measures in such a way as to put forward a coherent explanation for the results outlined above. By using the attitudinal questions, participants were identified as trusting or prudent on the one hand and trustworthy or untrustworthy on the other. Players with a value of the trust index (V47) above the median (=5 as it happens) were defined as trusting and others prudent; similarly, a composite index of trustworthiness was constructed from the answers to the relevant questions⁸. Those with values above the median (=22) were defined as untrustworthy, others (≤ 22) were defined as trustworthy. It is worth observing that there was no correlation in our sample (both overall and for each experiment separately) between trusting and trustworthy individuals as defined here. Table 4 reports the mean amounts sent and the mean return ratio overall, and separately for the two sample divisions - trusting/prudent and trustworthy/untrustworthy.

⁸ Specifically, the index is the simple sum of responses to the questions of the form: Is it (from never =1 to always =10) justified to...e.g. evade taxes and so on. The resulting index covers the full possible range (from 8 to 80) with median =22. It might be more appropriate to think of this index more in terms of civic sense, rather than trustworthiness per se.

In analysing the results we will test our hypothesis whereby the declared attitude towards trust reflects the self-perception about the participants' own propensity to trust people and the declared attitude towards trustworthiness reflects the participants' disposition to reciprocate as witnessed by their willingness to comply with civic values.

Comparing trusting and prudent individuals, one may observe that in the trust (investment) game, trusting individuals in the role of first movers, send much more (mean = 4.4) than prudent individuals (mean = 2.9) as one might expect. When playing the dictator game, however, trusting and prudent first movers send approximately the same amounts on average. Looking at the trustworthy/untrustworthy divide, amounts sent in the trust game is virtually the same for the two groups of individual (3.50 for the trustworthy group and 3.63, actually a little more, for the untrustworthy group). In the dictator game there is a modest difference between the trustworthy (mean tokens sent = 3.44) and the untrustworthy (mean = 3.00). What is striking is that the "trustworthy" send less than the "trusting". This result seems to confirm that the propensity to send depends more on the expected reciprocal behaviour by others which in turn is influenced by the trusting nature of the participants, rather than on some sense of fairness or other-regarding preferences manifest in the civic nature of players. Another indirect proof of this behaviour is that trusting individuals and – to a lesser extent – trustworthy individuals "invest" in the interaction of the trust game more than in the DG1, where no strategic reasoning applies. Overall, considering the two groupings together, we may conclude that in a setting of strategic interaction such as the TG the personal disposition to send money to the other player matters more than altruism and/or the declared attitude towards civic values.

As for respondents, the general presumption is confirmed that both the self-evaluation of one's own disposition to trust and the evaluation about the appropriateness of compliance with civic values influence reciprocating behaviour. Yet, some more profound insights emerge, as strategic interaction appears to draw out conditional cooperation. As we have reported above, in our experiment, similarly to the Cox one, the amount on average sent by all participants in the TG is in excess with respect to the DG1. However, comparing the amount returned in the TG and in the modified dictator game (DG2), the first distinction (trusting/prudent) presents little difference between the return ratio of the two groups, but trusting individuals return a smaller proportion of the amounts received in the TG than in the DG2 design. A plausible reason for this is the fact that the amount sent in the TG is on average much smaller with respect to the Cox experiment. Thus, we suggest that there is evidence of strong reciprocity, in the sense that the "trusting" feel betrayed by the first mover and react by returning a small amount. Data become even more telling by taking into account also the second divide (trustworthy/untrustworthy). The mean return ratio, which for

trusting and prudent were 1.61 and 1.45 (TG) and 1.76 and 1.55 (DG2) respectively, are nearly 70% higher for trustworthy (1.84) than for untrustworthy individuals (1.10)). Similarly to the above reported analysis with the two divisions (trusting/prudent and trustworthy/untrustworthy) across Senders, the trusting and – to a much larger extent - the trustworthy send back in the trust game a larger amount than the prudent and the untrustworthy, respectively.

Table 4: ‘Cox’ – type experiments, mean amounts sent and mean return ratio by attitudinal trust and trustworthiness

		Mean Tokens Sent		Mean return Ratio	
			N		N
All	TG	3.58	33	1.50	31
	DG1	3.24	33	-	-
	DG2	-	-	1.64	31
Trusting	TG	4.40	15	1.61	11
	DG1	3.08	12	-	-
	DG2	-	-	1.76	14
Prudent	TG	2.89	18	1.45	20
	DG1	3.33	21	-	-
	DG2	-	-	1.55	17
Trustworthy	TG	3.50	14	1.84	17
	DG1	3.44	18	-	-
	DG2	-	-	1.55	18
Untrustworthy	TG	3.63	19	1.10	14
	DG1	3.00	15	-	-
	DG2	-	-	1.78	13

Note: The return ratio is defined as the amount returned divided by the amount sent by the first mover. This is very slightly different from Glaeser et al. (2000) where the denominator is the amount **received** from the first mover. The only difference is the multiple of 3.

Figures 4 and 5 reinforce the evidence based on means. Figure 4 reports the relative frequency of players for the distribution of the amounts sent by trusting and prudent individuals in TG and DG1 respectively; figure 5 the distribution of the return ratio for trustworthy and untrustworthy individuals in the TG and DG2 designs. The evidence for trusting and prudent individuals in the TG/DG1 comparison is very different from the evidence for trustworthy and untrustworthy individuals in the TG/DG2 comparison. In figure 4, there is no obvious pattern of difference in the tokens sent between the trusting in the TG and the DG1. However, from figure 5 one can see that the relative weight of TG trustworthy individuals increases as the return ratio becomes larger.

Indeed, at return ratios higher than 1.0 – 1.9, the relative frequency of the trustworthy in the TG is larger than the corresponding frequency of the trustworthy in the DG2.

Figure 4: Amounts sent by Senders, TG and DG1, separately for “trusting” and “prudent” individuals

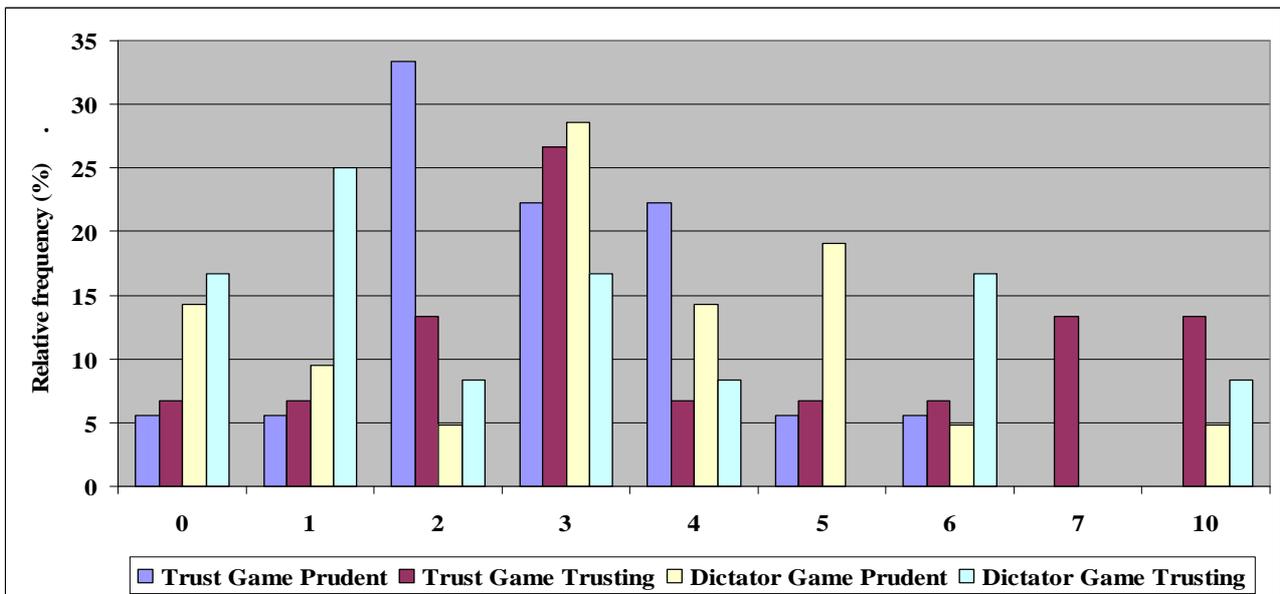
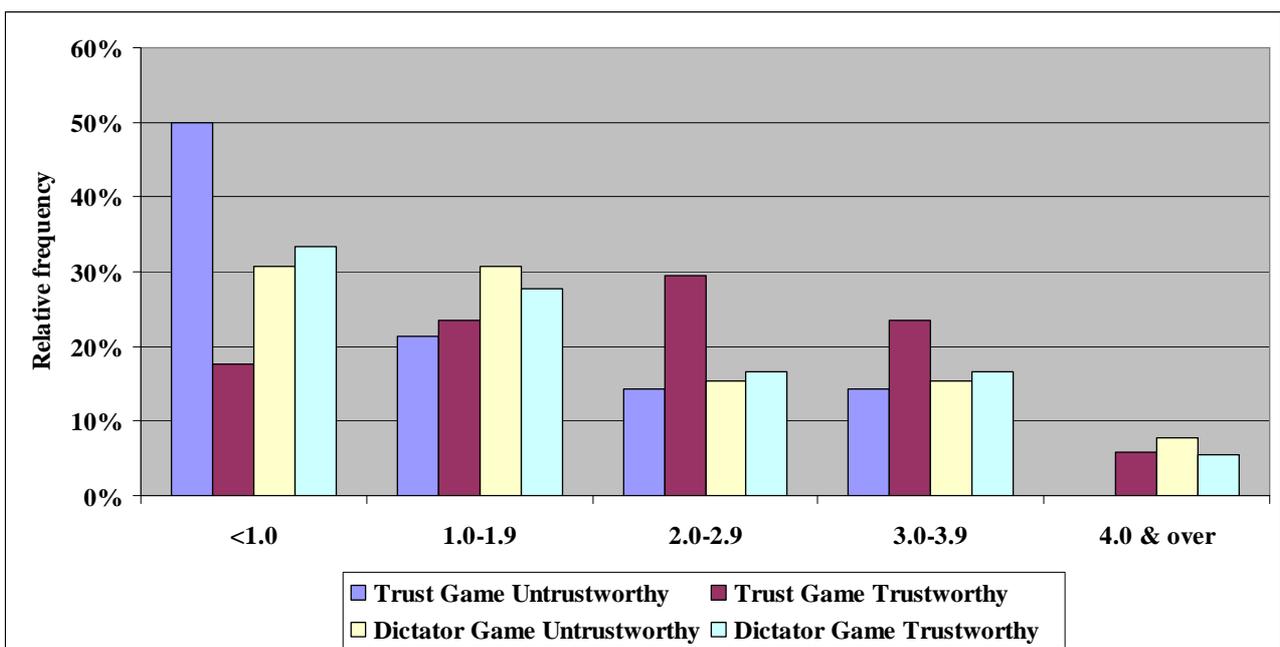


Figure 5: Distribution of the return ratio, TG and DG2, for “trustworthy” and “untrustworthy” individuals



Thus, the evidence considered here suggests two considerations. First, strategic behaviour drives behaviour more than altruism. In fact, for the “trustworthy” the reciprocity motive does actually play a more important role than the altruistic sentiment. Given that in the DG2 the amounts received by second movers were not decided by the potential beneficiaries of the dictators magnanimity, ‘trustworthy’ individuals are rewarding the flesh and blood Sender, even though they don’t know precisely who that is, more generously than they reward an unidentified individual who is not physically present – in which case they treat the amount received as manna. Similarly, but looking from the point of view of “negative reciprocity”, by sending back a smaller amount than the “trustworthy” in the TG and a larger in the DG2, the “untrustworthy” seem inclined to punish a selfish sender. Overall, the behaviour of the trustworthy highlights reward, the positive side of reciprocity, while the behaviour of the trusting who feels betrayed and of the untrustworthy who stick to a sceptical view about his social environment both point to punishment, the dark side of reciprocity.

Second, the trusting and the trustworthy both send more in the TG than in the DG1, but the trustworthy return less than the trusting send, thus suggesting that in the TG strategic interaction the desire to “invest” is more important than compliance with civic values in motivating individuals. Hence, the motive for trusting and reciprocating behaviour do not necessarily overlap within the same individual. Recent experimental research (Fehr and Schimdt, 2001, 2005) indicates that trust and trustworthiness can hardly be disentangled, since individuals tend to reciprocate and to respond to the social behaviour they observe in real life contexts.⁹ We agree with this statement, inasmuch it means that the level of trust manifested by each agent is moulded by his own life experience, and thus also by the degree of trustworthiness of individuals belonging to his social environment. However, our results induce us to believe that a subject who self-reports and behaves as a trusting individual will not necessarily exhibit a high degree of trustworthiness. To the same token but from the opposite perspective, subjects who report themselves as being “trustworthy” and put forward a reciprocating behaviour should not be expected to necessarily “invest” a large amount when playing the role of the trustor. The tentative implication of our results is that individual behaviour as far as trust and trustworthiness are concerned should be related to the “multiple self” view (Elster, 1986). Since in the personality of each individual many components are gathered together, in playing different roles in his various social interactions the individual is also differently motivated. The fact

⁹ In the words of Bacharach, Guerra, and Zizzo (2001), “(o)nce it can be shown that it is reasonable to expect trustworthiness there is no longer any mystery about trust, since trust is typically a best reply to this expectation” (Ibidem, pp.1-2).

that trust and trustworthiness may be interwoven within each agent does not imply that a subject's disposition to reciprocate simply overlaps with the same subject's disposition to reciprocate.

6. Concluding remarks

Our experimental design had two aims. First, to find out whether, and possibly to what extent, answers to a questionnaire about attitudes to trusting and reciprocating predict the subjects' behaviour; second, by comparing behaviour in Trust and Dictator Game, to disentangle the strategic motivation (the intention of the trustor to elicit benevolence from the trustee, and the trustee's interest in reciprocating to generous or not so generous invoice) from the altruistic motivation.

An important outcome of our investigation is that no simple or direct correlation shows up between behavioural trust or trustworthiness and attitudinal trust or disposition to reciprocate, as resulting from the self-declared disposition to trust and comply with civic virtues. From the statistical and econometric treatment of behavioural evidence and answers to the questionnaire, we observe that the link between the questionnaire and experimental sessions is more subtle than the mere correlation between average attitudes and average behaviours. In fact, the relevant evidence starts blossoming after that the two main motivations for trust and reciprocity behaviour – strategic reasoning and altruism – have been separated out, by dividing subjects according to the varying degree witnessed by answers of disposition to trust and to be trustworthy.

First, the self-declared trusting tend to “invest” more than the prudent, and the self-declared trustworthy are more inclined to reciprocate than the untrustworthy. As for individuals playing as trustor, we have found a neat divide between subjects who self-report a positive disposition towards trusting (and then are willing to send a significant amount to the trustee) and those who instead are very reluctant to “invest” in the strategic relationship of the Trust Game (and thus send a small amount). Similarly, as for individuals playing as trustee, they do not seem to be influenced much – on average - by the amount they received, but in case of a small amount received they seem motivated by the desire to punish the sender, as they return much less than had received. The trustworthy are inclined towards strategic behaviour - both in the positive sense of rewarding the sender, and the negative one of punishing – more than “being nice to others”, as could have been manifested by a significant correlation between the amount returned in the DG2 and the amount returned in the TG. Overall, we find that strategic interaction is more important than social preferences in motivating subjects' behaviour. The more trusting are the subjects, according to their

answers to the questionnaire, the more they send as trustors, and the less they send back as trustee in case the senders deserves to be punished for having sent a small amount.

Second, another important insight stemming from the analysis is that the disposition to trust, and the degree of compliance with civic values, appear to separately motivate people. In playing the Trust and the Dictator Games, our subjects performed as “multiple selves”, whose heterogeneity in behaviour seems to depend on the different motivations at stake in social interactions. No simple or direct correlation was found between attitudinal trust and trustworthiness - the self-declared disposition to trust and to comply with civic values - and behavioural trust and trustworthiness in experiments, respectively. The disposition to trust and the disposition to reciprocate separately motivates the subject when he opens the strategic relationship playing as sender, and when he reciprocates playing as respondent. The different weight of the motive entailed by the context - and not a wholly coherent behavioural inclination of the individual – seems to drive the action.

Finally, on methodological grounds, our investigation cast some doubts as to the possibility of establishing a direct link between attitudinal and experimental evidence, as far as trust and trustworthiness are concerned. The answers to a questionnaire predict behaviour in experimental sessions only to a limited extent. The information conveyed by a survey appears to be much more powerful *after* the two motivational components have been separated out by means of the comparison between the results of the Trust Game and each of the two Dictator Games respectively. Once the answers to the questionnaire have been employed for the statistical evaluation of the sessions, our interpretation of experimental results in terms of the two alternative motives for behaviour - social preferences or strategic behaviour – has fairly improved. As for further research work on this topic, the message is to extensively use the attitudinal measures in analysing experimental evidence.

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Appendix: Trust & reciprocity questions

	Range/values
Individual Characteristics	
Age	
Sex	
Degree course	Economics (1 st -3 rd year); Communication sciences (1 st -3 rd year); Political Science (1 st -3 rd year); Post-graduate
Mother & Father's education	1 = none 2 = primary 3 = lower secondary 4 = upper secondary 5 = tertiary
Family economic situation	1 = well-off 2 = above average 3 = below average 4 = low
Trust/Reciprocity Questions:	
<i>In general, would you say that you can trust most people or that one can never be too careful?</i>	1 = trust 2 = prudent (0 = don't know)
<i>How much trust do you have in the following groups:</i>	
- Your Family	1 = no trust
- People you know	2 = trust a little
- New acquaintances	3 = trust quite a lot
- Immigrants	4 = trust completely (0 = don't know)
<i>Ethnic Diversity?</i>	From 1 = lowers social harmony To 10 = is valuable
<i>Which of the following behaviours may be justified:</i>	
- To try to obtain benefits form the State to which you are not entitled	From 1 = never justified To 10 = always justified (0 = don't know)
- To not pay your taxes	
- To take and drive someone else's car without their permission	
- To make false statements to further ones own interests	
- To have an extra-marital affair	
- To accept a bribe	
- To pay for services 'under the counter' to avoid paying taxes	
- To not pay for your bus ticket	
<i>How much trust do you have in the following Institutions:</i>	
- Government	1 = no trust
- Parliament	2 = trust a little
- Political Parties	3 = trust quite a lot
- Civil Service/Servants	4 = trust completely

	(0 = don't know)
Most people a) try to take advantage of you every time they can; or, b) try to behave correctly towards you	From 1 = always try to take advantage To 10 = always try to behave correctly (0 = don't know)