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Understanding Trust

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Abstract

The World Values Survey (WVS) question on trust has been used in more than 500 papers to study the economic effect of trust. Recent work, however, questions the validity of this measure as an accurate measure of trust by showing that it is not correlated with the sender's behavior in a typical trust game widely used in the experimental literature. What measure then should we trust to measure trust? In this paper we argue that trust, as measured by the behavior of senders in a trust game, has two components: a belief-based component and a preference-based one. Whereas senders' behavior in a standard trust game reflects both, we show that WVS-like measures capture mostly the belief-based component of a trust game.

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Trust, as defined by Luhmann (1979), encompasses people's beliefs about others and their willingness to use that knowledge as the basis for action. Since Arrow (1972) remarked that "It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence," economists have started paying attention to the effect of trust on economic activity and development. In an influential paper, Knack and Keefer (1996) find that a country's level of trust is indeed correlated with its rate of growth and this correlation persists even after controlling for the quality of law enforcement (Knack and Zak (1999)). Since these early contributions, many of the papers that analyze the economic effects of trust use the answer to the World Values Survey (WVS) / General Social Survey (GSS) question "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?", to measure trust. Despite its broad use, existing empirical evidence on the correlation between the WVS-question and the experimental measure of trust is mixed, which questions the validity of the WVS measure as an accurate measure of trust. On the one hand, both Glaeser et al. (2000) and Lazzarini et al. (2003) have shown, in an experimental setting, that the answers to the WVS-question are not correlated with sender behavior in the standard trust game first introduced by Berg, Dickhaut and McCabe (1995). To the contrary, these answers are correlated with the receiver's behavior in the same game. These papers conclude that the WVS-question is a measure of trustworthiness and not of trust. On the other hand, Fehr et al. (2003) and Bellemare and Kroeger (2007) challenge this result. By using a large sample of German and Dutch households, respectively, these studies show that the sender behavior in a trust game is correlated with other survey-based measures of trust, which in turn are not correlated with trustworthiness.

Our paper is not an attempt to reconcile the opposite predictions of the previous works, but to make a contribution in answering several important questions that arise from their findings[1]: Are survey-based measures good measures of trust? More

[1] The disparities in the results of these studies can be attributed to the different subject pools or the different experimental protocols that these papers use. We discuss these issues in detail in the Discussion section of this paper. Moreover, for a review of cross-cultural differences in trust behavior see also Cardenas and Carpenter (2005).

specifically, given its preeminence in the literature, what is the WVS-question measuring? Is it trust, trustworthiness, or neither of the two? How can we explain the correlation between the answer to the WVS-trust question and individual (Guiso, Sapienza, and Zingales 2007) or aggregate (Guiso, Sapienza, and Zingales 2004 and 2006) economic choices? Can we dismiss the WVS-question based on the assumption that the Berg et al. (1995) trust game and its variations provide an accurate measure of trust? Or should we reject the trust game as a measure of trust since, as Levitt and List (2007) claim, in the lab there are several factors, such as scrutiny by the experimenter, that distort subjects' behavior? In other words, can we trust the trust game and/or the WVS-question to accurately measure trust?

The trust game aims to provide an experimental measure of trust. However, various experimental papers have shown that senders' behavior in the trust game is affected by other motivations besides beliefs in the receiver's trustworthiness. These include individual risk aversion (Karlan, 2005; Schechter, 2007) and other-regarding preferences like altruism (Cox, 2004; Ashraf et al., 2006). In light of these results, we understand the act of trusting as the combination of two components: beliefs in other people's trustworthiness and the specific preferences of the sender (risk aversion, inequality aversion, altruism)[2]. It is useful to keep these two components of trust separate because: i) their persistence across different situations might be different, and ii) their persistence outside of the lab might be different (as Levitt and List (2007) argue, in the lab we observe a lot of pro-social behavior because subjects feel they are under the experimenter's scrutiny and thus behave in a more socially acceptable way). Since the ultimate goal is to find a measure of trust that captures some general attitudes of a population, it is important to find out what component(s) of the trust game (if any) measure trust so defined, and what the WVS-trust question measures, as well as the relationship between the two.

To answer these questions, in this paper, we run a modified trust game in which all participants play both as senders and as receivers. Senders are initially endowed with $50 and are asked to send an amount between $0 and $50 to the receiver, this amount is tripled by the experimenter and then the receiver is asked to decide how much of the

[2] For a distinction between preferences and beliefs in the related literature see Bohnet et al. (2004 and 2008).

received amount to return to the sender. In addition, we ask the sender to report her beliefs about the receiver's behavior for every possible amount sent, by using the strategy method. By doing so, we can separate the sender's expectations about the behavior of the receiver (the beliefs component) from her actions, which are affected also by her utility function. In addition, the use of the strategy method allows us to compare the trust behavior of senders for different amounts sent. We find that senders' expectation of the receiver's trustworthiness is correlated with the quantity sent in the trust game, together with her preferences. Interestingly, we find that beliefs are significantly correlated with the quantity sent only when subjects send more than 25% of their initial endowment. This is interesting because in a trust game like ours where only senders are initially endowed and the amount sent is tripled, sending an amount to the responder lower or equal to 25% of the initial endowment can be interpreted as an act of charity (i.e. not involving beliefs in others' trustworthiness) rather than an act of trust.

We then turn to examine the WVS-trust question. We find that senders' expectations are correlated with the WVS-trust question, as well as other attitudinal questions on trust. This suggests that the WVS-question captures the expectation component of the trust game. Most interestingly, expected trustworthiness is only correlated with the WVS-question when the sender is calculating the expected amount returned when she sent a large amount. This result further supports the idea that for smaller amounts of money sent, the sender's decision in the trust game does not involve trust.

When we analyze the correlation between the sender's expectations of the receiver's trustworthiness with the sender's actual trustworthiness when she plays as a receiver, we find that players extrapolate their opponent's behavior from their own. This finding can explain why in some cases the WVS-question is correlated with trustworthiness.

The rest of the paper proceeds as follows. Section I describes the experimental design, the subject pool, and the survey, and presents summary statistics. In Section II we analyze senders' behavior in the trust game and how it relates to their expectations and preferences. In Section III we analyze the relationship between the WVS-trust question

and the trust game. Section IV presents a discussion of related issues, and section V concludes.

I. Experimental Design and Survey

The data for this experiment was collected as part of the Chicago-Templeton MBA Longitudinal Study (CTMLS). All the full-time MBA students of the 2008 class at the University of Chicago's Booth School of Business were asked to complete a survey and take part in a laboratory experiment as part of a mandatory class. While participation was mandatory, the Institutional Review Board at the University of Chicago required that the subjects be offered the opportunity to opt out from the study by not consenting to the use of their data for research purposes. Of the 550 MBA students, 548 completed the survey and 544 played the games; 502 (92.28%) of them consented to the use of both their survey and experimental data. For this paper, we use data from these two sources in addition to admission data obtained from the school (also with the students' consent). Each of these datasets is described below.

a) Survey and subject pool

Completing the survey was compulsory and was done online. It was sent to the students two weeks before the games took place and the deadline was the start of the experiment. We kept track of the dates and times at which students completed the survey. On average, students completed the survey 7.33 days before participating in the games. The survey was designed to acquire demographic data and measure various personality traits (all the questions asked in the survey are available in Reuben et al., 2007). In this paper we use several variables from the survey that aim to measure trust. Our main survey measure of trust is the standard World Values Survey question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" We provided three answers for subjects to choose from: i) Most people can be trusted, ii) Can't be too careful in dealing with people, iii) Don't know. Table 1 – Panel A shows summary statistics about this variable: a bit more than half of the subjects in our sample (53.59%) answered that most people can be trusted.

The survey included two additional questions regarding trust attitudes that are useful for our analysis as additional measures of trust. The first: "Suppose that a new and very desirable dorm/apartment has become available. The University of Chicago organizes a lottery to assign it among the many applicants. How confident are you that the allocation will be fair?" The choice of answers was: i) Not at all, ii) Not much, iii) Quite a lot, iv) A great deal, v) I don't know. Almost 90% of the students answered that they trust the University of Chicago quite a lot (41.04%) or a great deal (45.62%). Only 0.79% does not trust it at all. The second question was: "Suppose that while walking on Michigan Avenue in Chicago you lose your wallet with $1,000 dollars inside. A random person that you do not know finds it. He or she does not know you, but he or she is aware that the money belongs to you and knows your name and address. He or she can keep the money without incurring any punishment. According to you, what do you think is the probability he or she will return the money to you? (Report a number between 0 and 100, where 0 means that the money won't be returned for sure and 100 means that it will be returned for sure.)." On average students thought they had a 34.82% chance of getting their wallet back. The mode is at 50% with 95 students, and 37% of the students thought that the probability was less than 25%. Additional summary statistics for these variables can be found in Table 1 – Panel A.

Table 1 – Panel B provides pair-wise correlations between the three trust variables. Both the wallet question and the Chicago question are positively and statistically significantly correlated with the WVS-trust question and with each other.

We also use information provided by the admissions office of the University. It includes additional demographic characteristics of the subjects such as their age, their gender, and their GMAT score. We will use these variables as controls in our analysis. Table 1 – Panel C shows summary statistics of these variables. Average age in our sample is 28.3 years, 31% of subjects are female, and their average GMAT score is 705.

b) Laboratory experiments

The laboratory experiments consisted of two lotteries, four games and an auction played in the following order: lottery with losses, asset market game, trust game, competition game, chocolate auction, social dilemma game, and lottery without losses.

The experiment was programmed in z-Tree (Fischbacher, 2007) and played in four sessions in four large classrooms. We paid students by randomly drawing one game/lottery at the end of the experiment. In total, 544 MBA students participated in the experiment and earned on average $78.32 in addition to a $20 show-up fee. The experiment lasted approximately one and a half hours.

In this paper we concentrate on the trust game, the social dilemma game and the lottery game without losses. The trust game is the main object of this study. We use the social dilemma game and the lottery game as explanatory variables in our analysis. Below is a description of these games. For a description of the other games see Reuben et al. (2007).

b.1) The trust game

The trust game we used is a slightly modified version of the trust game initially designed by Berg, Dickhaut, and McCabe (1995), henceforth BDM, but also widely used in the experimental literature. In this game a sender is endowed with an amount of money y. The sender decides how much to send, $s \in [0, y]$, to a receiver. Any amount sent is multiplied by three. The receiver then decides how much to return, $r \in [0, 3s]$, to the sender. Consequently, the payoff of the sender equals $y - s + r$, and that of the receiver equals $3s - r$. The amount sent is frequently referred to as a measure of trust, and the amount returned as a measure of trustworthiness.

In our experiment, subjects were asked to make three decisions: first they all played the trust game in the role of the sender, then we elicited their beliefs about the behavior of the receiver, and third they played the trust game in the role of the receiver. The screenshots that students faced when playing the trust game can be found in the appendix. Subjects' earnings were determined by randomly selecting one of the three decisions at the end of the experiment. When making a decision, subjects did not know what future decisions they would be asked to make; however, subjects did know that they would make three decisions and it was emphasized that the three decisions were independent in the sense that their choices in one decision would not affect their earnings

in subsequent decisions. In between decisions, no feedback was given with respect to the behavior of other subjects.[3]

In the first decision, subjects played as senders and decided how much of their initial endowment of $50 they wanted to send to the receiver. They could send any amount between $0 and $50 in multiples of five. In the second decision, subjects indicated how much they expected the receiver to return for each possible amount sent (filling an array like the one in screenshot 2 in the appendix). In order to motivate subjects to answer accurately, their earnings in this decision consisted of $10 for each amount sent when the distance between their expectation and the actual response was within ten percent of the amount received (i.e. if $r - 0.1 \times 3s \leq E[r] \leq r + 0.1 \times 3s$)[4]. In the third decision subjects played as receivers and were asked to indicate the amount they were willing to return for every possible amount sent, that is, they made their choices using the strategy method (Selten, 1967).[5] To facilitate calculations during their third decision, subjects could use two buttons to calculate how their decision would affect their earnings and the earnings of their opponent[6].

Hence, each subject played the trust game twice, once in the role of the sender and once in the role of the receiver. Subjects were randomly re-matched so when they played as senders and receivers they played with a different person. Subjects were not

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[3] Due to the logistics of running such a large experiment, the three decisions were made sequentially in the same order by all subjects. Note that since no feedback was given, subjects made their decisions with the same information.

[4] Incentivized procedures to elicit the mean of a distribution require complicated elicitation techniques due to potential differences in risk aversion and probability weighting (Manski, 2002; Offerman et al., 2009). For this reason, we opted for a cognitively simpler elicitation procedure that would not distract subjects from the game they were playing.

[5] The strategy method has been criticized for it may elicit strategies that differ from those used in a strictly sequential environment. However, in a recent survey Brandts and Charness (2009) analyze around 30 papers and find that evidence mostly suggests that the strategy method and the direct-response method produce similar results. If there are any differences, one can observe a difference in games that involve punishment, but not in sequential social dilemmas like the trust game. Also see Brandts and Charness (2000) and Vyrastekova and Onderstal (2005) for additional discussion on the strategy method.

[6] The instructions for this game and the three screenshots that the students were presented with can be found in the appendix.

informed of the identity of the people they played with, which when combined with the large sample size ensures that their decisions were anonymous.

Subjects in our sample sent on average $18.82, which is 37.64% of senders' initial endowment. The standard deviation of the amount sent was $14.9. Figure 1 displays the distribution of quantities sent. Table 2 reports additional summary statistics of subjects' behavior in the trust game. The second and third columns of this table show respectively the average return and the average return proportional to the amount received, for every quantity sent (displayed in the first column). The fourth and fifth columns display average and proportional expected returns also conditional on the quantities sent. Both the returns and the returns proportional to the amount received are strictly increasing with the amount sent. That the expected return as a proportion of the quantity sent is systematically 4 to 6 percentage points above the actual return as a proportion of the amount received suggests that subjects were overly optimistic about the receiver's trustworthiness.

b.2) The lottery without losses

We use the lottery without losses to measure subjects' risk aversion in small gambles. In a similar way as Holt and Laury (2002) we asked subjects to choose 15 times between two options: Option A and Option B. When choosing Option A subjects could win an amount of dollars with certainty, ranging from $50 up to $120 in increments of five. Option B always consisted of a lottery offering $200 or $0 with equal probability. At the end of the game one of the fifteen choices was randomly chosen and subjects were paid according to their decision[7].

According to the payoffs in this game, an extremely risk averse individual should choose Option A in all settings, whereas an extreme risk seeking individual should always choose Option B. For those in-between, as the certain amount increases, a subject should cross over from Option B to Option A. The less risk averse the subject is, the later the switch will occur. A risk neutral individual should choose Option B until Option A is worth $95 or $100 and then switch to Option A. We refer to the last value of Option A

[7] The screenshots of this game can be found in Reuben et al. (2008).

for which the subject chooses Option B as the subject's certainty equivalent,[8] which is a measure of the subject's risk aversion provided that the subject changed options at most once.[9]

Figure 3 displays the number of risky choices made by subjects in our sample. On average, subjects made 7 risky choices (standard deviation is 3.5) corresponding to an average certainty equivalent of \$80. The mode is 10 risky choices (certainty equivalent \$95) with 107 students (21.31% of the sample). Only 21 students (2.93% of the sample) made more than 11 risky choices exhibiting risk loving behavior.

b.3) The social dilemma game

Subjects played a social dilemma based on the commonly used linear public good game (Marwell and Ames, 1981; Isaac, Walker, and Thomas, 1984). Subjects were randomly assigned to groups of eight and given an endowment of \$50. Each subject then decided whether to contribute c to the public good. Contributions to the public good are costly to the subject, but increase the earnings of others. Specifically, subject i's earnings equal $\$50 - c_i + 0.3 \times \sum_j c_j$. Unlike in most public good experiments, the contribution decision was binary: subjects could contribute either all their endowment or nothing, $c \in \{\$0, \$50\}$. Note that overall payoffs are maximized if all eight subjects contribute \$50. However, since an individual receives only \$15 for her \$50 contribution, she maximizes her monetary payoff by not contributing.

The experiment was designed to elicit the willingness of subjects to conditionally cooperate. For this purpose, we used a variation of the design employed by Fischbacher, Gächter, and Fehr (2001) and Fischbacher and Gächter (2009). Subjects made two contribution decisions: first an "unconditional" decision and after that a "conditional" one. The unconditional decision was simply to either contribute the \$50 to the public good or not. For their conditional decision, we used the strategy method (Selten, 1967) to allow subjects to condition their contribution on the number of group members

[8] In reality the certainty equivalent would fall within \$5 of this number. That is, if a subject switches to the safe choice at \$100, the certainty equivalent falls between \$95 and \$100.

[9] The risk aversion measure was set to missing for 23 subjects because they switched options more than once. In addition, we assigned a certainty equivalent of \$45 to the 42 subjects that always chose the safe option and one of \$120 to the 9 subjects that always chose the risky option.

contributing to the public good. Specifically, subjects had to indicate whether they would contribute their $50 if *x* other group members also contributed theirs, and *x* ranged from 0 to 7[10]. To determine each subject's payoff, one of the two decisions was randomly selected. If the unconditional decision was chosen then that subject's payoff was given by her unconditional decision, the unconditional decision of the six other group members, and the conditional decision of one group member. If the conditional decision was chosen, the subject's payoff was given by her conditional decision and the others' unconditional decision. All subjects made both decisions without knowing what others in their group did. Furthermore, when making their unconditional decision, subjects were not aware their second decision would be the conditional one.

We use subjects' conditional cooperation choices in the social dilemma game to measure other-regarding preferences.[11] This measure includes several motivations of social preferences since, as stated by Fishbacher et al. (2001), conditional cooperation can be considered as a consequence of some fairness preferences like "altruism", "warm-glow", "inequity aversion" or "reciprocity".[12] Table 3 shows summary statistics of subjects' cooperation conditional on other participants' cooperation. On average, subjects tend to cooperate more the more other subjects cooperate in their group. However, when inspecting the data at the individual level, we observe that subjects are heterogeneous. If we use the classification of Fischbacher et al. (2001), we find that 232 subjects (46.59%) exhibit 'free riding' behavior, i.e. they never cooperate; 246 subjects (49.40%) are (weakly) monotonic conditional cooperators, i.e. they start to cooperate as more subjects cooperate, with 24 of them (i.e. 4.82% of the sample) cooperating only when the 7 other subjects in the group cooperate; and 20 of them (4%) exhibit hump-shaped contributions

[10] The screenshots of this game can be found in Reuben et al. (2008).

[11] Since our objective is to distinguish preferences and beliefs in the subjects' behavior, we disregard the unconditional cooperation choice because this decision may be based, in addition to preferences, on beliefs about other subjects' willingness to cooperate.

[12] As in the basic models of social preferences, i.e. dictator game, cooperation game; our setting is not designed to distinguish among different types of other-regarding preferences. In addition to that, efficiency gains, i.e. the fact that the amount sent is tripled (or doubled), may also motivate the sender to send positive amounts if she trusts that the receiver is willing to share such gains (Charness and Rabin 2002, Ashraf et al. (2006).

meaning that they start to cooperate as more subjects cooperate in their group, but they stop cooperating after a higher number of other subjects cooperate.

For our analysis in subsequent sections, we use the subjects' conditional strategy as a measure of their other-regarding preferences. Specifically, we have created a dummy variable that equals the number of times a subject cooperates in the conditional cooperation setting. For brevity's sake, we report regressions using only this definition of other-regarding preferences. However, our results are not sensitive to defining this variable differently.[13]

II. What Does the Trust Game Measure?

Trust, as defined by Luhmann (1979), encompasses people's beliefs about others and their willingness to use that knowledge as the basis for action. The World Values Survey question on trust aims to measure generalized trust, that is, the beliefs of the respondent regarding the trustworthiness of others in general. The trust game aims at measuring senders' willingness to trust a receiver. As such, the WVS-trust question should be correlated with senders' behavior in a typical trust game. However, if we want to use an experimental measure of trust like the trust game to "validate" the WVS question, we need to be clear about which aspect of the trust game captures the same idea. Recent research has pointed out that the sender's behavior in the trust game is affected by several other factors in addition to trust, starting with risk aversion (Karlan, 2005; Schechter, 2007). Even if individuals should be risk neutral for small gambles, they are often not (e.g. Holt and Laury, 2002). Hence, if we want to extract the trust

[13] We replicate the results of the paper using the following four alternative measures of other-regarding preferences: a dummy variable that equals 0 if a subject never cooperates and equals 1 otherwise, a dummy variable equal to the previous one but excluding the 20 subjects that show hump-shaped behavior, another dummy that takes the value of 0 if a subject never cooperates or if she cooperates only if 7 other subjects cooperate, and 1 otherwise and, a dummy that equals the last one but excludes the 20 subjects that show hump-shaped behavior. The additional regressions are available upon request from the authors.

component from the amount sent in a trust game, we should at the very minimum control for risk aversion.[14]

In addition to that, senders' behavior in the trust game is indicative of expectations in receivers' trustworthiness only if senders are selfish. However, if people were selfish they would always return zero when acting as receivers, which is neither the case in the trust games reported in the literature, nor in ours. In fact, it is remarkable that 90% of the MBA students in one of the most economically-minded MBA programs in the world actually returned a positive amount. Indeed, from its inception, researchers have interpreted the behavior of the receiver in the trust game as an indication of other-regarding preferences.[15] For example, with a triadic design, Cox (2004) finds evidence that receivers are motivated by both reciprocity and altruism. If subjects have other-regarding preferences when they play as receivers, it is likely that they have other-regarding preferences when they play as senders. In our sample, when we tried to rationalize each sender's behavior as an optimal choice given her expectation and her level of risk aversion, we could not make sense of it unless we hypothesized that the sender had some form of other-regarding preferences[16]. We thus expect senders in our trust game to exhibit other-regarding preferences.

Other-regarding preferences may in fact be particularly important in the trust game studied in this paper. As explained before, we use a modified version of the typical BDM-trust game. The major difference between the BDM game and the one that we and many others use is that in this version only the sender is initially endowed with money, whereas in the BDM version both the sender and receiver are initially endowed. When receivers are not endowed, egalitarian senders will send money to receivers regardless of whether they trust them or not, that is, they act based only on their other-regarding

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[14] In a related paper Houser, Schunk and Winter (2009) find that risk attitudes do not predict decisions in the trust game.

[15] The following are some of the models that can explain why receivers return money: Rabin (1993), Levine (1998), Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Charness and Rabin (2002), Dufwenberg and Kirchsteiger, (2005), Falk and Fischbacher, (2005), and Cox, Friedman, and Sadiraj (2008).

[16] For example, individual choices in our data can be explained as rational ones if we assume—following Fehr and Schmidt (1999)—that a sender's expected utility depends not only on her payoff, but also on the comparison between her payoff and her opponent's payoff. This analysis is available from the authors.

preferences. Therefore, we need to confirm the extent to which senders in our trust game send money to receivers as an act of trust. Finally, by the definition of trust, we expect senders' elicited expectations about others' returns to also determine the quantity sent.

Overall, our hypothesis is that the behavior of senders in the trust game can be divided into two components: preferences and beliefs, with beliefs being the actual component of trust[17]. In theory, the two are clearly distinct. Per given type of preferences, an individual who has higher expectations about other people's trustworthiness will send more. Similarly, per given level of expectations, a more altruistic individual (or a less risk averse individual) will send more. In order to isolate these two components we use the amount a sender expects to receive in return for a given amount sent. This expectation should be unaffected by the sender's utility function and should be a true measure of the sender's expected level of the receiver's trustworthiness—that is, trust.

We show the results of our hypothesis tests in Table 4. Panel A displays the results of a conditional logit regression[18]. In this framework, behavior is predicted by combining the expected utility of each element of the choice set in one single econometric model. Since we elicited expectations using the strategy method, the amount expected back is conditional on the amount sent. The data are organized in a panel of subject-alternative observations, with 10 observations per subject which correspond to the possible quantities sent: {$5, $10, $15, …, $50}. The dependent variable is a binary variable that corresponds to the alternative chosen by each subject. For example, if a subject chose to send $20, the subject-alternative observation which corresponds to choosing $20 takes the value of 1 and the rest of subject-alternative observations (which the subject did not choose to send) take the value of 0. As independent variables we include one alternative-specific variable: the expected returns (which are conditional on the quantity sent and which also vary by individual); and several individual-specific variables: risk aversion, other-regarding preferences, age, gender and Gmat score. We run one single regression with 4250 individual-alternative observations using the conditional

[17] In addition, the trust game and the trust-WVS question may take into account different degrees of anonymity and this may be a reason why the two might not always be correlated. We develop these ideas in the discussion section of the paper.

[18] We thank one anonymous referee for suggesting this strategy.

logit model. We obtain one single regression coefficient for the alternative-specific variable, the beliefs; and 10 coefficients for each individual-specific variable corresponding to each quantity sent. The results of this model show that the decision to send a given amount of money is correlated with both the beliefs and the preferences of the sender. As expected, the likelihood of choosing a particular amount sent increases with expected returns. In particular, the odds that a subject chooses to send a certain amount increase by 3% with each dollar increase in expected returns. Risk tolerance and other-regarding preferences are also positively correlated with the likelihood of sending a particular amount.[19]

The previous econometric framework combines the expected utility of each element of the choice set in one single econometric model to predict behavior. The advantage of this model is that it exploits all the data that we obtained when asking subjects to elicit expected returns using the strategy method. A different econometric framework consists in estimating ten separate regressions to predict investments using the expected amount returned for each possible amount sent. We report the results of such econometric strategy in panels B and C. As we will see below, this analysis, even though less rich because it only uses one observation per subject in each regression, is useful to study subjects' behavior in our setting. In a first approach, the regressions in Panel B include only the expected return conditional on sending $50. Then, in Panel C, we include ten different regressions with the expected returns conditional on each possible amount sent. Column I of Panel B displays the amount in dollars that subjects sent as a function of their risk tolerance (i.e. the certainty equivalent of the lottery), their other-regarding preferences (i.e. their willingness to conditionally cooperate in the social dilemma game) and the WVS-trust question. More risk-tolerant individuals send more, as do subjects who are motivated by other-regarding preferences. Increasing the certainty equivalent by $5 increases the amount sent by 90 cents on the dollar (i.e. 0.18*5); or alternatively, a one-standard deviation decrease in risk aversion leads to a 17% increase

[19] It is plausible to think that unobservable traits are correlated with both the decision to send money in the trust game and the decision to cooperate in the social dilemma game (i.e. the other-regarding preferences), given the joint nature of the decision-making process in this experiment. Hence, a causal interpretation of this variable is not warranted.

in the average amount sent[20]. Also, people with other-regarding preferences send on average \$0.80 (4.25%) more to receivers[21]. The WVS-trust variable has a positive and statistically significant effect at the 10% level. Subjects who respond that most people can be trusted send on average \$2.72 more to the receiver. However, this effect loses its statistical significance when we control for the senders' expected return (conditional on \$50 being sent), even though the estimated coefficient does not change much. The senders' expected return in contrast becomes significant at the 1% level (Column II). The variable 'expected return' captures the beliefs of the senders with respect to other subjects' trustworthiness. As we will see below, this variable is correlated with the WVS-trust variable; hence in Column III, we run the same regression as before but omitting the WVS-trust variable. A one standard deviation increase in the expected trustworthiness of others (conditional on \$50 sent) increases the average amount sent by 24%. According to these results, the quantity sent in the trust game is indeed a combination of two components: the preferences of the sender (risk aversion and other-regarding preferences) and her beliefs in others' trustworthiness (trust)[22].

In Table 4 – Panel C, we have regressions similar to those in the third column in Panel B, but with senders' expected returns conditional on all the possible quantities sent. That is, the first column in Panel C shows the results of the regression where the senders' expectations correspond to an amount sent equal to \$5, the second column shows the regression results where the senders' expectations correspond to an amount sent equal to

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[20] We also computed a constant relative risk aversion coefficient by assuming a utility function of the form $u(x) = x^{1-r}/1-r$, where r is the coefficient of relative risk aversion. We obtain an interval for the coefficient of risk aversion using the payoffs of the different lotteries, the hypothesized utility function, and the cross-over point from the risky to the riskless option of each subject. We use the mid-point of this interval as the relative risk aversion coefficient of each subject. When conducting the above analysis with the constant relative risk aversion coefficient, our results do not change.

[21] Since our objective is to distinguish preferences and beliefs in the subjects' behavior, we do not use the unconditional cooperation choice because this decision may contain, in addition to preferences, beliefs about other subjects' willingness to cooperate. Nonetheless, we have run a check with the unconditional cooperation variable and unconditional cooperation also seems to be correlated with the quantity sent in the trust game.

[22] In our model we assume that beliefs are not correlated with social preferences. This is a standard assumption in the economic models of other-regarding preferences (Fehr and Schmidt (2006).

$10, and so on. We also include demographic characteristics as additional controls. The expected trustworthiness is significantly related to the quantity sent at the 1% level in all regressions except the ones where the expectation corresponds to amounts sent equal to $5, $10 and $15. This result is intuitive in a trust game like ours, in which only the sender receives an initial endowment and the amount sent is multiplied by 3. The reason is that a sender remains better off than her responder (i.e. has higher earnings) as long as she sends $12.50 or less of her initial endowment. Thus, for these (low) amounts sent, sending money to the receiver can be interpreted as an act of charity more than an act of trust. This may be the reason why beliefs are not significantly correlated with the quantity sent for these amounts.

The coefficient and significance of the rest of variables stay the same in all these regressions, confirming that the behavior of senders in the trust game combines beliefs and preferences. As for the controls, age has a negative and significant effect on the quantity sent, and subjects with higher GMAT scores send significantly more. Females tend to send less, but the coefficient is not significant.

III. Does the WVS-trust question capture beliefs in others' trustworthiness?

Since the WVS-trust question aims to measure generalized trust, we expect this question to capture the expectation component of the trust game. However, this expectation does not need to be linearly proportional to the act of trust across the different possible amounts sent (in fact, it is not). As it appears above, for low amounts of money sent, beliefs do not enter the behavior of senders; our interpretation is that, for these amounts, such behavior may be closer to an act of charity than to an act of trust. However, as senders pass more money on to the receivers, they may hope to inspire acts of reciprocity. If this is true, it should be reflected in the correlation between WVS-trust question and beliefs: one would expect the WVS-trust measure to be correlated with beliefs only for quantities sent above $12.50. Hence, not only it is important to determine whether the WVS-question is related to the expectation of trust at all, but it is also important to establish to what level of expectations it is connected to. This is what we determine next.

In Table 5, we test whether the WVS-question on trust captures the expectation component of trust. For this purpose, we regress the WVS-trust question on the sender's expectation of money returned by the receiver. Since we elicited expectations using the strategy method, the amount expected back is conditional on the amount sent. Panel A regressions show that for low amounts sent (less or equal to $25), the expected return has a positive coefficient, but it is not economically nor statistically significant. For higher amounts, however, the coefficient of expected returns is statistically and economically significant suggesting that the WVS-trust question captures beliefs in other people's trust: the odds that a subject responds that most people can be trusted increase by 0.9% with each dollar increase in expected returns. Moreover, as explained above, the fact that the significance of the WVS-trust question is not linear along the conditional beliefs further supports that the belief component of the trust game captures trust. This result is robust to additional controls[23]. In addition to that, in a different specification we estimate a similar regression by putting the WVS-trust variable on the right-hand side (and beliefs on the left-hand side) and we instrument WVS-trust with two other measures that appear correlated with it. The reason is that, given its dichotomic nature, the WVS-question is necessarily a very noisy measure of trust. Our instruments correspond to the two survey questions explained in Section I: the probability of recovering a lost wallet and students' trust in the University of Chicago. If the effect is spurious, it should disappear; but if it is real, the estimated coefficient should increase because the IV estimate eliminates the attenuation bias typical of coefficients of noisy proxies. According to our estimates, when subjects send $50, those who respond that most people can be trusted expect back 50% more than subjects who disagree with this statement.[24] Our results suggest that the WVS-

[23] Available from the authors.

[24] Given that the instruments we use are variables collected in the same survey where the WVS-trust question was asked, concerns may arise regarding spurious correlation between these variables. Indeed if a subject suffered from a given shock prior to responding these questions (e.g. her wallet was stolen), she may have responded in a similar way to all the questions causing spurious correlation among them. This can affect the first stage regression results, but should not affect the way subjects answered in the trust game since, as explained in the description of the games above, subjects completed the survey on average 7.33 days prior to playing the games.

question is a good, while noisy, proxy of the expectation component of the trust game. This estimation is available from the authors.

IV. Discussion

In light of our results, two puzzles still remain. First, why do Glaeser et al. (2000) find that the WVS-trust measure is not correlated with the sender behavior, whereas others (Fehr et al (2003) and the present paper) find that sender behavior is correlated with the WVS-trust measure? Second, why does the former paper find that the WVS-trust measure is correlated with receiver behavior? Unfortunately, all these papers employ different experimental designs of the trust game; hence providing an answer to the above puzzles proves challenging. However even though the objective of our paper is not to reconcile the diverse experimental procedures, when examining the specificities of each paper in detail we can think of a plausible explanation to these puzzles.

Two basic differences between the experimental designs of Glaeser et al. (2000), Fehr et al. (2003), and ours concern the anonymity among subjects and the homogeneity of the subject pool. Concerning the anonymity among subjects, in Glaeser et al. (2000) a significant number of subjects know the identity of the subject they are matched with (i.e. their objective was to create variation in social connectivity) and the game includes a non-binding promise condition (i.e. before the sender decided how much to send to the receiver, the receiver has to check one of two statements: promise to repay at least as much as the amount sent or no promise to repay). As a result of these two features, the average amount sent is 83%, with 71% of the sample sending the entire endowment of $15. This is well above the average amount sent in the trust game literature (around 50%) and in our paper (37.64%). In the Fehr et al. (2003) paper, as in our paper, subjects have no way of knowing who they are matched with and this contributes to subjects sending smaller amounts.

The degree of homogeneity of the subject pool also differs among these papers. The Glaeser et al. (2000) subject pool consists of a homogeneous group of Harvard undergraduates (with self-selection to participate in laboratory experiments). In Fehr et al. (2003), the subject pool corresponds to a sample of German households; thus probably much more heterogeneous than the Harvard subject pool. The subject pool in our sample

falls somewhere in between the previous two: it corresponds to a group of MBA students, who did not interact with each other before the game and who did not know each other well because they were just two weeks into the first quarter of their program, and whose participation in the experiment was mandatory.

The anonymity among subjects in a sample (or the lack of it) coupled with the degree of homogeneity of the subject pool in each of the three papers are, we think, the most plausible explanations for the above puzzles.

Anonymity (or the lack of it) can explain when the WVS-trust question will be correlated with sender behavior in the trust game. In a sample, like Glaeser et al. (2000) sample, where subjects know very well the other players (even if they ignore whom they are matched with), subjects' expectations will be formed on the basis of their specific knowledge of that group. In this situation it is unlikely that the WVS-question, which intends to measure trust in strangers, carries a lot of information because opponents are not perceived as generic "others" but as members of a specific group "my fellow classmates" (see the experimental work on stereotyping by Fershtman and Gneezy (2001) and Bornhorst et al (2005)). By contrast, when subjects are matched with anonymous participants of a large group (other Germans in Fehr et al. (2003) and other Dutch in Bellemare et al (2007)), it is reasonable to expect that WVS-trust-like questions carry some information about subject's expectations. Unfortunately, Fehr et al. (2003) and Bellemare et al. (2007)) do not ask the WVS-question to their sample. But they ask similar questions and they find that these questions have some explanatory power. In this respect, our sample is in between because it is drawn from a student body; but these students come from different backgrounds, nationalities, and the age range is larger than that of student undergrads. Also, these students had just arrived to the program and did not know each other well. So it is not surprising that the WVS-question has some, but not enormous, explanatory power on the sender's behavior.

On the other hand, the degree of homogeneity of the subject pool may explain why in some cases the WVS-trust question predicts trustworthiness. In a homogenous group introspection might be the optimal way to predict the opponent's behavior. By contrast, in a very heterogeneous sample this extrapolation is unlikely to take place. As Table 6 – Panel A shows, this effect is strong in our sample. The amount returned by a

subject (i.e. her trustworthiness) explains 33% to 38% of the variability in her expectations. For every extra dollar a subject returns to her opponent, her expectation increases by 60 cents, regardless of the amount involved. If it is true that the reason why trustworthiness affects the sender's behavior is because it affects her expectations, we should find that trustworthiness is not predictive of the amount sent when it reflects the behavior at low amounts sent, but we should find that it is predictive when trustworthiness is referring to higher stakes. We test this hypothesis and report the results in Table 6 – Panel B. As expected, for amounts sent that are lower than $12.50 of the initial endowment, trustworthiness does not predict the amount sent while for high monetary levels of it, it does. This is true even after controlling for the other determinants of the amount sent, i.e. risk aversion and other-regarding preferences. We know from Table 5 that the amount expected back is correlated with the WVS measure of trust for high amounts sent; then, if beliefs, in homogeneous samples, are formed by taking into account a subject's own trustworthiness, it is only natural that trustworthiness is also correlated with WVS-trust. Table 6 – Panel C shows that we find this pattern in our data. Generally, extrapolation of subjects' own behavior may explain why the WVS-question is correlated with trustworthiness in other homogeneous samples like Glaeser et al. (2000) and Lazzarini et al. (2003); and why they are not correlated in the Fehr et al. (2003) or the Bellemare et al. (2007) samples, in which subjects differ.[25] However, further empirical research is needed in order to confirm these arguments.

[25] An additional difference among the three papers we are examining concerns the initial endowment and multiplier of the amount sent. Glaeser et al (2000) give $15 as initial endowment only to the sender and the amount sent is multiplied by 2. Fehr et al (2003) endow both senders and receivers with 10 euros and the amount sent is doubled as well as the amount returned. In our experimental design we give $50 to the sender as initial endowment and the amount sent is multiplied by 3. When only the sender is endowed, other-regarding preferences have an amplified effect. This is what we find in our paper. But, other things equal, this feature should not affect the relationship between the WVS-trust question and sender behavior in the trust game. Moreover, when the quantity sent is multiplied by 2 instead of 3 there is a lower incentive to send if one expects nothing back. However, Fehr et al. (2003) still find evidence of trust in the sender behavior.

V. Conclusions

The concept of trust is playing an increasing role in economic analysis and this increased role requires an increased understanding of how to measure it. This paper clarifies some conflicting results on the relationship between the WVS measure of trust and the sender's behavior in the trust game. We show that the trust game measure of trust combines two components: the preferences of the sender and her beliefs in others' trustworthiness, the latter being the definition of trust (Luhmann, 1979). While the sender's behavior in the trust game reflects both beliefs and preferences, we show that WVS-like measures capture mostly the beliefs part.

Our analysis suggests that, in order to measure trust, it is better to use WVS-like measures and/or the sender's expectation about the receiver's behavior, since sender's behavior in the trust game includes the preferences of the sender in addition to her trust. We also show that the WVS measure is a noisy measure and as such can severely underestimate the effects of trust. For this reason, every time we want to use such a measure it is advisable to combine multiple survey-based responses as done by Tabellini (2005) and (2008).

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Tables and Figures

Table 1: Summary Statistics

Panel A describes the three trust measures obtained from the survey and it displays summary statistics for each of them. The first column contains the name of the variable, the second, the question asked in the survey, the third, all the possible answers, the fourth, the distribution of responses, the fifth, one the mean and standard deviation. Panel B presents the raw correlations among the main survey variables. In each cell, the first number is the coefficient, the second is the p-value and the third is the number of observations. Panel C describes main demographics of our sample.

Panel A: Description and Summary Statistics of Variables in the Survey

Variable name	Question/Description	Answer range	Frequency (n. obs.)	Mean (std. dev.)
Trust	Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?	i) Most people can be trusted (1)	53.59% (269)	0.592 (0.492)
		ii) Can't be too careful (0)	36.75% (185)	
		iii) Don't know (.)	9.56% (48)	
Trust U. Chicago	Suppose that a new and very desirable dorm/apartment has become available. The University of Chicago organizes a lottery to assign it among the many applicants. How confident are you that the allocation will be fair?	i) Not at all (1)	0.79% (4)	3.364 (0.682)
		ii) Not much (2)	8.76% (44)	
		iii) Quite a lot (3)	41.04% (206)	
		iv) A great deal (4)	45.62% (229)	
		v) I don't know (.)	3.78% (19)	
Trust wallet	Suppose that while walking on Michigan Avenue in Chicago you lose your wallet with 1,000 dollars inside. A random person that you do not know finds it. He or she does not know you, but he or she is aware that the money belongs to you and knows your name and address. He or she can keep the money without incurring any punishment. According to you, what do you think it is the probability he or she will return the money to you?	Report a number between 0 and 100, where 0 means that the money won't be returned for sure and 100 means that will be returned for sure.	Prob. < 25%: 37%	34.82 (22.82)
			Prob. between 25% and 49%: 26%	
			Prob. between 50% and 74%: 32%	
			Prob. between 75% and 100%: 6%	

Panel B: Correlations Among the Survey Trust Questions

	Trust WVS	Trust U. Chicago	Trust wallet
Trust WVS	1 454		
Trust U. Chicago	0.1204 (0.0118) 437	1 483	
Trust wallet	0.2113 (0) 454	0.1261 (0.0055) 483	1 502

Panel C: Description of Sample Demographics

Variable name	**Question/Description**	**Answer range**	**Frequency / n. obs.**	**Mean (std. dev.)**
Age	The age of each subject	Integer from 22 to 38	502	28.31 (2.48)
Gender	The gender of each subject	Male (0) Female (1)	347 male 155 female	0.308 (0.462)
GMAT score	Score obtained at GMAT test befor entering MBA program	Integer from 510 to 800	502	704.78 (44.54)

Table 2 – Returns and Expected Returns Conditional on the Amounts Sent in the Trust Game

The first column displays all the possible amounts sent in the trust game, second and third columns show the average and proportion amounts returned for every quantity sent, respectively. The fourth and fifth columns display average and proportion expected returns also conditional on quantities sent.

Amount sent	Average returned (in $)	Return as proportion of amount sent x3 (%)	Expected return (in $)	Expected return as proportion amount sent x3 (%)
0	0	.	0	.
5	3.91	26.07	4.5	30.65
10	8.14	27.13	10.09	33.66
15	12.73	28.29	15.86	35.24
20	18.6	31.00	22.10	36.84

25	24.47	32.63	28.18	37.57
30	30.64	34.04	35.15	39.05
35	36.4	34.67	41.15	39.19
40	41.83	34.86	46.74	38.95
45	47.24	34.99	52.96	39.23
50	53.93	35.95	60.40	40.26

Table 3: Conditional Cooperation in the Social Dilemma Game

Table 3 shows the number of subjects that cooperated and defected in the social dilemma game conditional on the number of other subjects cooperating in their group.

Number of other subjects cooperating in the group	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cooperate (frequency)	11	25	26	73	144	210	224	243
Defect (frequency)	491	477	476	429	358	292	278	259
Total	502	502	502	502	502	502	502	502

Table 4: Determinants of Senders' Behavior in the Trust Game

Panel A displays the results of a conditional logit model. In this regression the quantity sent to the second mover is a binary outcome variable which equals 1 if a given quantity was sent by the subject and 0 otherwise. There are 10 observations per subject. The panel reports the estimates of the correlations between the quantity sent in the trust game and three main independent variables: risk tolerance, other-regarding preferences, and expectations in other players' trustworthiness / trust. Risk tolerance corresponds to the certainty equivalent at which the subject switched from the risky to the riskless option in the lottery game explained in Section II of the paper. A higher value means a higher tolerance to take risks. The variable other-regarding preferences corresponds to the variable we created from the social dilemma game which we also explain in section II. The regression in Panel A also includes other covariates: age, gender and Gmat score. Panel B reports OLS estimates of regressions for the quantity sent in the trust game on the same main variables as in panel A. In the second and third regressions, the expected return corresponds to the amount of money that subjects expect to receive in return when they send an amount equal to $50. When we introduce the trust-WVS question in the first and second regressions, the number of observations decreases because 44 subjects responded "I do not know" to the trust question. Panel C displays the results for the same regression as regression III in Panel B, but using the expected returns conditional on all the possible quantities sent in the trust game. All ten regressions in Panel C also include additional demographic controls explained in Section II and summarized in Table 1 – Panel C. Standard errors are in parentheses. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

Table 4 – Panel A

Quantity Sent to second mover – Conditional Logit									
	if sent $10	if sent $15	if sent $20	if sent $25	if sent $30	if sent $35	if sent $40	if sent $45	if sent $50
Expected Trustworthiness (conditional)				0.03 (0.006)***					
Risk Tolerance	0.004 (0.01)	0.006 (0.012)	0.02 (0.01)*	0.018 (0.012)	0.04 (0.01)***	-0.000 (0.02)	0.04 (0.01)***	0.01 (0.02)	0.05 (0.01)***
Other-Regarding Preferences	0.13 (0.08)	0.12 (0.10)	-0.01 (0.09)	0.08 (0.10)	0.12 (0.11)	-0.03 (0.19)	0.06 (0.12)	0.39 (0.20)**	0.24 (0.10)**
Age	0.002 (0.07)	-0.04 (0.09)	0.09 (0.07)	0.006 (0.08)	0.01 (0.09)	-0.17 (0.16)	-0.06 (0.09)	-0.09 (0.18)	-0.13 (0.09)
Gender	-0.63 (0.36)*	-0.58 (0.46)	-0.41 (0.40)	-0.68 (0.46)	-2.51 (0.8)***	-0.71 (0.82)	-0.55 (0.53)	0.16 (0.88)	-1.13 (0.52)**
Gmat Score	0.002 (0.003)	0.01 (0.005)*	0.000 (0.004)	-0.004 (0.004)	-0.000 (0.005)	0.005 (0.008)	0.01 (0.006)**	0.001 (0.009)	0.02 (0.006)***
Constant	-1.6 (3.31)	-7.13 (4.54)	-4.27 (3.72)	0.24 (4.04)	-4.6 (4.7)	-1.86 (7.86)	-13.4 (5.53)**	-3.65 (8.01)	-16.0 (5.10)***
Observations	4250	4250	4250	4250	4250	4250	4250	4250	4250

*Sent $5 is the base alternative.

Table 4 – Panel B

Quantity Sent to second mover			
	I	II	III
Risk Tolerance	0.18***	0.17***	0.17***
	(0.04)	(0.04)	(0.04)
Other-regarding preferences	0.82**	0.73**	0.59*
	(0.36)	(0.33)	(0.32)
Trust-WVS	2.49*	1.59	
	(1.42)	(1.36)	
Expected trustworthiness of other (if sent $50)		0.15***	0.15***
		(0.02)	(0.02)
Constant	1.24	-5.44	-4.74
	(3.32)	(3.39)	(3.23)
Observations	434	434	478
R-squared	0.068	0.146	0.137

Table 4 – Panel C

Quantity Sent to second mover										
	if sent	if sent	if sent	if sent	if sent	if sent	if sent	if sent	if sent	if sent

	$5	$10	$15	$20	$25	$30	$35	$40	$45	$50
Risk Tolerance	0.17*** (0.04)	0.17*** (0.04)	0.17*** (0.04)	0.16*** (0.04)	0.16*** (0.04)	0.16*** (0.04)	0.15*** (0.04)	0.16*** (0.04)	0.16*** (0.04)	0.16*** (0.04)
Other-regarding preferences	0.84** (0.35)	0.82** (0.35)	0.83** (0.35)	0.83** (0.34)	0.85** (0.34)	0.83** (0.34)	0.77** (0.33)	0.78** (0.33)	0.75** (0.33)	0.74** (0.32)
Expected trustworthiness (conditional)	-0.11 (0.22)	0.14 (0.12)	0.12 (0.08)	0.21*** (0.06)	0.24*** (0.05)	0.21*** (0.04)	0.20*** (0.03)	0.17*** (0.03)	0.17*** (0.03)	0.15*** (0.02)
Age	-0.37 (0.27)	-0.39 (0.27)	-0.39 (0.27)	-0.44* (0.26)	-0.48* (0.26)	-0.50* (0.26)	-0.53** (0.26)	-0.55** (0.26)	-0.55** (0.25)	-0.56** (0.26)
Gender	-1.59 (1.51)	-1.52 (1.52)	-1.55 (1.52)	-1.53 (1.49)	-1.47 (1.48)	-1.26 (1.48)	-1.29 (1.46)	-1.51 (1.46)	-1.36 (1.44)	-1.31 (1.44)
GMAT score	0.03** (0.02)	0.03** (0.02)	0.03** (0.02)	0.04** (0.01)	0.04** (0.01)	0.03** (0.01)	0.04** (0.01)	0.03** (0.01)	0.03** (0.01)	0.03** (0.01)
Constant	-6.73 (13.73)	-10.55 (13.41)	-11 (13.24)	-12.7 (12.93)	-14.08 (12.83)	-11.61 (12.83)	-12.79 (12.69)	-8.94 (12.75)	-10.2 (12.50)	-9.42 (12.40)
Observations	478	478	478	478	478	478	478	478	478	478
R-squared	0.068	0.071	0.073	0.093	0.115	0.119	0.137	0.135	0.149	0.153

Table 5: WVS-Trust

This table reports the estimates of a logit model of the WVS-Trust question on senders' expected returns. Since we used the strategy method, expected returns are conditional on the quantity sent. Standard errors are in parentheses. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

	If sent $5	If sent $10	If sent $15	If sent $20	If sent $25	If sent $30	If sent $35	If sent $40	If sent $45	If sent $50
Expected Return (conditional)	0.009 (0.03)	-0.004 (0.01)	0.001 (0.01)	0.004 (0.01)	0.004 (0.01)	0.010* (0.01)	0.011** (0.01)	0.009** (0.00)	0.008** (0.00)	0.009*** (0.00)
Constant	0.334** (0.16)	0.418** (0.17)	0.362** (0.18)	0.281 (0.20)	0.257 (0.21)	0.028 (0.22)	-0.05 (0.22)	-0.033 (0.22)	-0.047 (0.22)	-0.153 (0.22)
Observations	454	454	454	454	454	454	454	454	454	454

Table 6: Trustworthiness and Trust

Panel A reports the OLS estimates of regressing senders' expected return on the amount the same subject chose to return when playing as a receiver. Panel B shows the regressions of the amount a subject sent on the amount the same subject chose to return for different levels of money the opponent sent to her. Panel C displays the logit coefficients of the WVS-trust question on the amounts returned by subjects. All the variables are defined in Table 2. Standard errors are in parentheses. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

Panel A: Expected Return and Trustworthiness

	If sent $5	If sent $10	If sent $15	If sent $20	If sent $25	If sent $30	If sent $35	If sent $40	If sent $45	If sent $50
Amount Returned (conditional)	0.56*** (0.04)	0.60*** (0.03)	0.61*** (0.04)	0.54*** (0.04)	0.61*** (0.04)	0.58*** (0.04)	0.59*** (0.03)	0.61*** (0.03)	0.59*** (0.03)	0.59*** (0.04)
Constant	2.40*** (0.19)	5.25*** (0.36)	8.15*** (0.58)	11.98*** (0.80)	13.19*** (1.02)	17.34*** (1.27)	19.77*** (1.45)	21.07*** (1.67)	25.12*** (1.82)	28.67*** (2.19)
Observations	502	502	502	502	502	502	502	502	502	502
R-squared	0.326	0.383	0.353	0.313	0.368	0.34	0.362	0.383	0.381	0.356

Panel B: Amount Sent and Trustworthiness

	If sent $5	If sent $10	If sent $15	If sent $20	If sent $25	If sent $30	If sent $35	If sent $40	If sent $45	If sent $50
Amount Returned (conditional)	-0.16 (0.19)	-0.04 (0.10)	0.1 (0.07)	0.15*** (0.06)	0.19*** (0.05)	0.20*** (0.04)	0.19*** (0.03)	0.17*** (0.03)	0.16*** (0.02)	0.15*** (0.02)
Risk Tolerance	0.19*** (0.04)	0.19*** (0.04)	0.18*** (0.04)	0.18*** (0.04)	0.17*** (0.04)	0.17*** (0.04)	0.16*** (0.04)	0.17*** (0.04)	0.17*** (0.04)	0.16*** (0.04)
Other-regarding preferences	0.71** (0.33)	0.70** (0.33)	0.61* (0.33)	0.56* (0.33)	0.45 (0.33)	0.39 (0.33)	0.35 (0.32)	0.36 (0.32)	0.33 (0.32)	0.28 (0.32)
Constant	3.5 (3.28)	3.26 (3.28)	2.21 (3.28)	1.31 (3.27)	0.23 (3.26)	-1 (3.25)	-1.65 (3.22)	-1.89 (3.22)	-2.16 (3.21)	-2.15 (3.17)
Observations	478	478	478	478	478	478	478	478	478	478
R-squared	0.055	0.054	0.058	0.068	0.084	0.102	0.118	0.12	0.128	0.141

Panel C: WVS-Trust and Trustworthiness

If sent $5	If sent $10	If sent $15	If sent $20	If sent $25	If sent $30	If sent $35	If sent $40	If sent $45	If sent $50

Amount Returned (conditional)	-0.014 (0.03)	-0.01 (0.01)	0.001 (0.01)	0.009 (0.01)	0.01 (0.01)	0.016*** (0.01)	0.014*** (0.01)	0.012*** (0.00)	0.013*** (0.00)	0.012*** (0.00)
Constant	0.430***	0.452***	0.365**	0.214	0.134	-0.11	-0.145	-0.14	-0.243	-0.273
	(0.14)	(0.15)	(0.16)	(0.18)	(0.20)	(0.20)	(0.21)	(0.20)	(0.20)	(0.20)
Observations	454	454	454	454	454	454	454	454	454	454

Figure 1: Distribution of Quantities Sent in the Trust Game

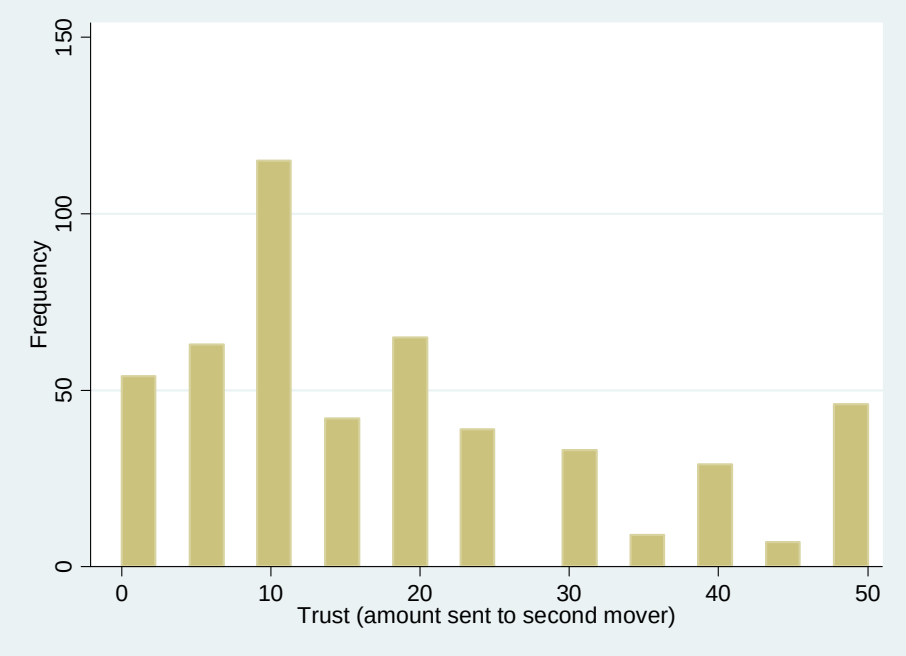
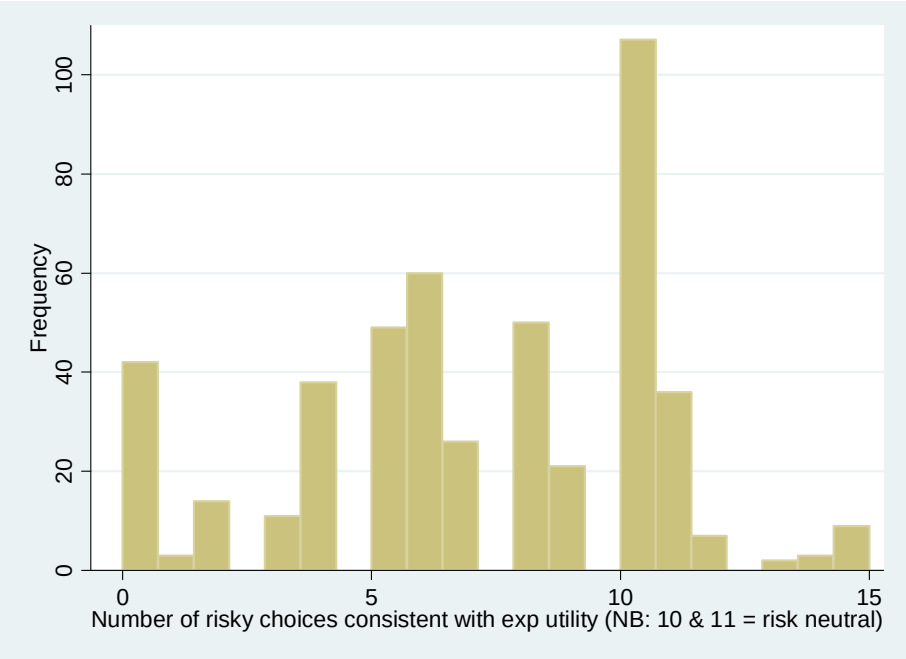


Figure 2: Distribution of the Number of Risky Choices Made by Subjects in the Lottery Game



APPENDIX

Instructions for the Trust Game

In this game you will make three different decisions. One of them will be randomly selected to determine your earnings for this game. Note that decisions are independent, that is, none of your decisions affects the earnings from the other decisions.

Instructions for senders (decision 1)

For this decision, you will be randomly paired with another participant. We refer to this participant as the responder. To start, you receive $50 (the responder does not receive any money). You must decide how much money to send to the responder. You keep every dollar not sent to the responder. Every dollar sent to the responder is multiplied by **3**. Then the responder will decide how much money to return to you. The responder keeps every dollar not returned.
Your earnings from this choice equal the amount you keep plus the amount returned to you by the responder. The responder's earnings equal the amount he/she keeps. Please use the slider below to decide how much to send to the responder. You can choose only multiples of five.

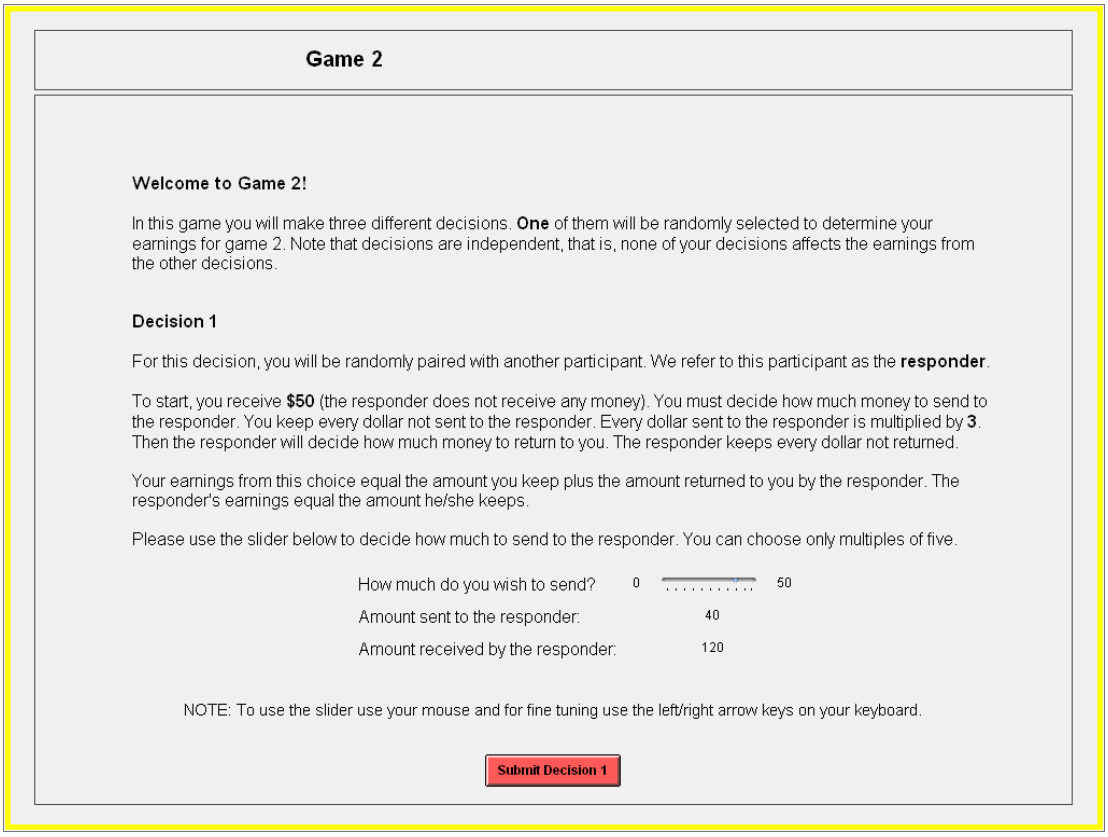
Instructions to elicit the expectations of senders (decision 2)

Now, we ask you to estimate the behavior of the responder. Depending on the accuracy of your estimations, you can earn up $100. We asked the responder to decide how much money to return for every possible sent amount. Please indicate how much money you expect the responder will return for every sent amount. You earn **$10** for every sent amount in which your estimation matches the responder's decision (with a 10% margin of error).
For example, suppose you estimate that, after receiving $150, the responder returns $100. If for that sent amount the responder decides to return between $85 and $115, you earn $10.

Instructions for receivers (decision 3)

For this decision, you will be randomly paired with another participant. We refer to this participant as the **sender**. Note that the participant with whom you are paired for this decision is **not** the same participant with whom you were paired before.
The sender will decide to send you between $0 and $50. The sent amount will be multiplied by 3. Please indicate, for **each** possible sent amount, how much you would like to return to the sender. Your earnings will depend on the precise sent amount and your answer below.
Note: you can use the calculate buttons to see how your choice affects your own as well as the sender's earnings.

Screenshots – Trust Game



Game 2

Decision 2

Now, we ask you to estimate the behavior of the responder. Depending on the accuracy of your estimations, you can earn up $100.

We asked the responder to decide how much money to return for every possible sent amount. Please indicate how much money you expect the responder will return for every sent amount. You earn **$10** for every sent amount in which your estimation matches the responder's decision (with a 10% margin of error). For example, suppose you estimate that, after receiving $150, the responder returns $100. If for that sent amount the responder decides to return between $85 and $115, you earn $10.

$ Sent	$ Received	Your expectations of the returned amount
$0	$0	$0
$5	$15	4
$10	$30	8
$15	$45	12
$20	$60	15
$25	$75	20
$30	$90	25
$35	$105	30
$40	$120	35
$45	$135	
$50	$150	

Submit Decision 2

Game 2

Decision 3

For this decision, you will be randomly paired with another participant. We refer to this participant as the **sender**. Note that the participant with whom you are paired for this decision is **not** the same participant with whom you were paired before.

The sender will decide to send you between $0 and $50. The sent amount will be multiplied by 3. Please indicate, for **each** possible sent amount, how much you would like to return to the sender. Your earnings will depend on the precise sent amount and your answer below.

NOTE: You can use the Calculate buttons to see how your choice affects your own as well as the sender's earnings.

$ Sent	$ Received	Your Decision (amount returned to the sender)	Your Earnings	Sender's Earnings
$0	$0	$0	$0	$50
$5	$15	5	$10	$50
$10	$30	10	$20	$50
$15	$45	15	$30	$50
$20	$60	20	$40	$50
$25	$75	25	$50	$50
$30	$90	30	$60	$50
$35	$105	35	$70	$50
$40	$120	40	$80	$50
$45	$135	45	$90	$50
$50	$150	50	$100	$50

Submit Decision 3 | Calculate | Calculate