

MEASURING TRUST: AN EXPERIMENT IN BRAZIL*

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RESUMO

Foi demonstrado que medidas atitudinais da confiança, como as empregadas pela World Values Survey (WVS) ou pela General Social Survey (GSS), correlacionam-se a variáveis importantes que refletem o desenvolvimento econômico e institucional de um país. Entretanto, Glaeser, Laibson, Scheinkman e Soutter (*Quarterly Journal of Economics*, 2000) descobriram que essas medidas atitudinais têm um baixo nível de correlação com medidas comportamentais da confiança, obtidas a partir de um "jogo da confiança" experimental envolvendo incentivos monetários. Replicamos o estudo de Glaeser *et al.* com sujeitos brasileiros e conduzimos o experimento em duas situações: em uma delas, os indivíduos se encontram cara a cara antes de interagirem; na outra, não podem fazê-lo. Descobrimos que o efeito das medidas atitudinais da confiança (como a escala WVS/GSS) sobre o comportamento de ter confiança exibido pelos sujeitos em transações experimentais parece ser significativamente maior quando eles não podem se encontrar pessoalmente (uma situação que não foi empregada no estudo de Glaeser *et al.*). Corroborando os resultados de Glaeser *et al.*, também descobrimos que as medidas atitudinais da confiança correlacionam-se significativamente com o comportamento confiável: indivíduos que afirmam confiar mais nas pessoas aparentemente são menos inclinados a agir oportunisticamente. Assim, avaliando medidas atitudinais da confiança dentro de situações experimentais apropriadas, descobrimos que medidas como a escala WVS/GSS parecem contribuir para explicar os comportamentos relacionados a confiar e a transmitir confiança.

Palavras-chave: confiança, capital social, economia experimental.

ABSTRACT

Attitudinal measures of trust, such as those employed by the World Values Survey (WVS) or the General Social Survey (GSS), have been shown to be correlated with important country-level variables reflecting economic and institutional development. However, Glaeser, Laibson, Scheinkman and Soutter (*Quarterly Journal of Economics*, 2000) have found that those attitudinal measures poorly correlate with behavioral measures of trust obtained from an experimental "trust game" involving monetary incentives. We replicate Glaeser's *et al.* study using Brazilian subjects and performing the experiment under two conditions: when individuals meet face-to-face prior to their interaction, and when they cannot do so. We find that the effect of attitudinal measures of trust (such as the WVS/GSS scale) on subjects' trusting behavior in experimental transactions appears to be significantly larger when they cannot meet face-to-face (a condition that was not employed in Glaeser's *et al.* study). Echoing Glaeser's *et al.* results, we also find that attitudinal measures of trust are significantly correlated with trustworthy behavior: individuals who affirm to be more trusting are apparently less inclined to act opportunistically. Thus, evaluating attitudinal measures of trust within appropriate experimental conditions, we find that measures such as the WVS/GSS scale appear to have a role in explaining both trusting and trustworthy behavior.

Key words: trust, social capital, experimental economics.

JEL classification: Z13, C92, C73.

* We thank the comments and suggestions by Eduardo Andrade, Cláudio Haddad, Carlos Alberto de Melo, José Scheinkman, Gregório Stukart, and anonymous referees. Financial support from Instituto Futuro Brazil and research assistance by Samuel Kinoshita, Mauri de Oliveira, and Verena Stukart are greatly acknowledged. Rinaldo Artes was partially supported by FAPESP (PROTEM 99/10611-8) and CNPq (PRONEX 66.2285/1997-2). All remaining errors and omissions are our own.

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1 INTRODUCTION

Trust, commonly defined as a person's subjective probability that his or her transacting party will act in a cooperative manner (e.g. Dasgupta, 1988; Gambetta, 1988), has received increasing attention in the economics literature. In theory, a society with a higher degree of trust can more fully exploit gains from exchange even in the absence of formal means of enforcement, thereby lowering transaction costs and prompting investments. (Arrow, 1974; Putnam, 1993). Several empirical studies have been conducted recently to examine this simple hypothesis. Thus, there is evidence that countries with higher level of societal trust tend to exhibit higher economic growth and investment relative to GDP. (Knack and Keefer, 1997; Zak and Knack, 2001). Other studies have also found that trust is positively correlated with variables such as governmental efficiency (La Porta, Lopez-Silanes, Shleifer and Vishny, 1997) and democracy (Paxton, 2002), thus suggesting that trust may have an indirect economic effect associated with institutional development.

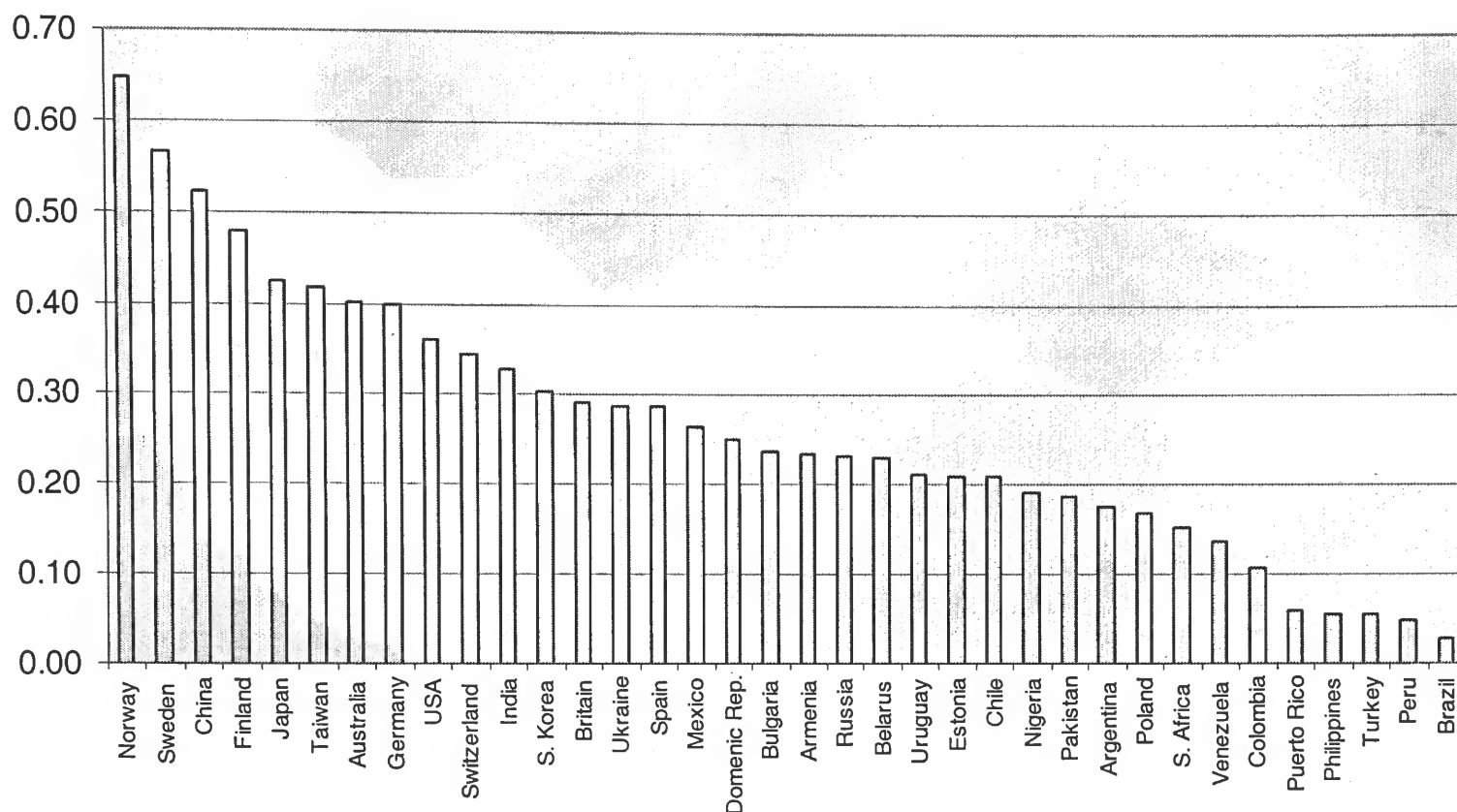
These cross-country studies tend to rely on data from questionnaires using psychometric, attitudinal scales. For instance, the World Values Survey (WVS), which is a collaborative effort among research organizations from several countries, applies the following question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" The same item is also used in the General Social Survey (GSS), which is used to monitor the evolution of trust and other variables within the United States.

Given the increasing use of WVS - and GSS - like measures of trust, a critical question is whether they really measure trust or something else. Using students from Harvard University, Glaeser, Laibson, Scheinkman and Soutter (2000) addressed this question by examining whether attitudinal, questionnaire-based measures of trust are statistically correlated with behavioral ones, obtained from experimental transactions. One of their experiments, a variant of Berg, Dickhaut and McCabe's (1995) "trust game," is basically an interaction between two people. Before their actual interaction, subjects respond to a questionnaire including the WVS/GSS trust item. Then the first person, or "sender," is granted a certain amount of money and has to decide how much to send to another person, located in another room. The other person, the "recipient," receives twice the amount sent, and has to decide how much to return to the sender. Assuming that people's payoffs are solely driven by monetary concerns, the predicted outcome of this game is straightforward: the sender will anticipate that the recipient will retain all the amount received, so the sender will refrain from sending even a penny. Thus, any positive amount transferred by the sender is an indication of his or her degree of trust on the recipient, i.e., the subjective probability that the latter will return part of the amount sent.

It is reasonable to suppose that this experimental approach to measuring trust is more precise than questionnaires, which lack a concrete exchange setting and monetary incentives to provide accurate responses. Thus, we can validate the WVS/GSS trust measure by examining its correlation with the behavior of subjects in the lab. Following this idea, we replicated the Glaeser *et al.* experiment, henceforth called the "Harvard" study, using Brazilian subjects, namely students from the University of São Paulo. We obtained the exact protocols from the authors and tried to match their experiment as close as possible. Our study, however, provides two distinct contributions. First, we run the same experiment in a country that has exhibited the *lowest* level of trust according to WVS data (Figure 1). This allows for an exploratory cross-country examination by comparing our results with data from the Harvard study, while recognizing the clear limitations of such an analysis (e.g., neither Harvard students nor our subjects are representative of the overall population in each country). Second, differently from the Harvard study, we run the "trust game" within two conditions. In the Harvard study, subjects could see the person with whom they were interacting.

In our study, we also examine interactions where individuals do not see their partners – which was the approach originally used by Berg *et al.* (1995). Presumably, this should reduce error in the validation of WVS/GSS measure because it avoid signals (verbal or physical) that individuals receive when they see each other prior to their interaction.

Figure 1 – Levels of trust in selected countries



Source: World Values Survey (1995-1997).

Despite these differences, and the fact that Brazilian subjects report lower levels of trust according to the WVS/GSS scale, our experimental results are similar to the Harvard study in the condition where subjects cannot see each other. However, we also find that the effect of some attitudinal measures of trust (including the WVS/GSS scale) on subjects' behavior in experimental transactions appears to be larger when individuals cannot see each other prior to their interaction. Namely, subjects who express low trust in the questionnaire tend to behave in a trusting manner if they see their partners, and refrain from trusting them if the interaction is anonymous. Thus, since most survey-based measures of trust refer to people in general, comparing attitudinal and behavior measures of trust in a situation where subjects can see one another is problematic since they may declare to not trust other people in the questionnaire and then receive signals that induce them to behave in a trusting manner. Additionally, we find that responses to the WVS/GSS scale are statistically correlated with the amount that recipients return to senders – a result that was also obtained in the Harvard study. Therefore, validating attitudinal measures of trust within appropriate experimental conditions, we find that measures such as the WVS/GSS scale appear to have a role in explaining both trusting and trustworthy behavior.

This paper proceeds as follows. We begin by describing the experiments used to gather behavioral measures of trust. We then proceed by analyzing our data and performing some comparisons using the results of the Harvard study. Concluding remarks follow.

2 THE EXPERIMENTS

2.1 Pre-experimental phase

Our subjects were students from the University of São Paulo recruited through e-mail messages and class announcements. Most students were economics or business majors, though we tried to avoid advanced students with training in game theory.¹ In our research – henceforth called the “USP” (University of São Paulo) study – 152 students agreed to participate, but only 138 participated in the actual experiments. By comparison, 258 students agreed to participate in the Harvard study, although only 189 yielded experimental data.

When subjects signed up for the experiment, they were handed a questionnaire including demographic, social, and academic questions, besides several trust-related items. This questionnaire and our other experimental materials are translations into Portuguese (jointly performed by the authors) of the materials used in the Harvard study. To facilitate comparison, the translation of the WVS/GSS trust variable was taken from the survey used by the research organization in Brazil who has collected data for the World Values Survey. Table 1 includes a description of the key trust-related attitudinal variables used in our analyses. The experiment was conducted one week after the sign up phase (around May-June of 2003).

Table 1 – Attitudinal measures of trust and trustworthiness

| Variable | Item(s) | |
|---|---|---|
| | English (Harvard study) | Portuguese (USP study) |
| WVS/GSS Trust | “Generally speaking, would you say (a) that most people can be trusted or (b) that you can’t be too careful in dealing with people?” | “De um modo geral, você diria (a) que se pode confiar nas pessoas em geral ou (b) que precisamos ter bastante cuidado quando tratamos com as outras pessoas?” |
| Trust Index | <ul style="list-style-type: none"> - WVS/GSS - “Would you say that most of the time people (a) try to be helpful, or (b) that they are mostly just looking out for themselves?” - “Do you think most people would try (a) to take advantage of you if they got a chance, or would they try (b) to be fair?” | <ul style="list-style-type: none"> - WVS/GSS - “Você diria que a maioria das pessoas (a) tentam ser úteis ou (b) estão na maioria das vezes apenas olhando para si mesmas?” - “Você acha que a maioria das pessoas tentariam (a) tirar vantagens de você se elas tivessem chance ou (b) ser justas?” |
| Trust Behavior Index (frequency scale) | <ul style="list-style-type: none"> - “How often do you lend money to your friends?” - “How often do you lend personal possessions to your friends (e.g., CD’s, clothes, bicycle, etc....)?” - “How often do you intentionally leave your rooming group’s hallway door unlocked (when nobody is home)?” | <ul style="list-style-type: none"> - “Com que frequência você empresta dinheiro a seus amigos?” - “Com que frequência você empresta artigos pessoais a seus amigos (ex., CD’s, roupas, bicicleta, etc....)?” - “Com que frequência você intencionalmente deixa a porta do corredor do seu quarto ou apartamento destrancada (quando ninguém está em casa)?” |
| Trust in Strangers (agreement scale) | <ul style="list-style-type: none"> - “These days you can’t count on strangers.” - “In dealing with strangers one is better off to be cautious until they have provided evidence that they are trustworthy.” | <ul style="list-style-type: none"> - “Nesses dias, não se pode confiar em estranhos.” - “Ao lidar com estranhos é melhor ser cuidadoso até que eles forneçam evidências de serem confiáveis.” |
| Self-reported Trustworthiness (agreement scale) | “I am always trustworthy.” | “Eu sou sempre confiável.” |
| Honesty Index (frequency scale) | <ul style="list-style-type: none"> - “How often do you lie to your parents?” - “How often do you lie to your roommates?” - “How often do you lie to casual acquaintances?” - “How often do you lie to close friends?” - “If you have a girlfriend/boyfriend, how often do you lie to her/him?” | <ul style="list-style-type: none"> - “Com que frequência você mente para seus pais?” - “Com que frequência você mente para os seus companheiros de quarto?” - “Com que frequência você mente para pessoas que você encontra casualmente?” - “Com que frequência você mente para amigos íntimos?” - “Com que frequência você mente para namorado/namorada.” |

¹ Knowing equilibrium concepts can bias the results towards the less cooperative outcome where no amount will be transferred from senders to recipients. (Frank, Gilovich and Regan, 1993).

2.2 The trust game

In the “trust game”,² a person (sender) is given a certain amount of money, which can be totally or partially transferred to another person (recipient), located in a different room. In the Harvard study, senders received US\$ 15. Given the high volatility of the Brazilian currency (real, R\$) by the time of our experiment, it was difficult to define an exchange rate, adjusted for purchasing power, that would enable cross-country comparison of results (e.g. Roth, Prasnikar, Okuno-Fujiwara and Zamir, 1991). We decided to choose an exchange rate of 2 because it roughly guaranteed that the amount of money received by senders could buy similar goods valued by students. Thus, US\$ 15 and R\$ 30 could equally buy one music CD in the USA and Brazil respectively by the time each experiment was carried out.

The trust game can be described as follows. The sender is given R\$ 30 and chooses to send to the recipient the total amount, a fraction of that amount, or nothing. The amount sent is doubled and informed to the recipient, which then gets to choose an amount to be returned. The amount returned can be either the total (doubled) amount that came from the sender, a fraction of this amount, or zero. After the recipient’s decision, the sender then receives a monetary payoff equal to \$30 minus the amount sent to the recipient, plus the amount returned. The recipient, in turn, receives twice the amount sent minus the amount returned to the sender. Supposing that subjects’ behavior is driven only by monetary considerations, the predicted outcome (subgame perfect equilibrium) of this game is simple. Since the recipient’s payoff is decreasing with the amount that is returned to the sender, the recipient will choose to return zero. Anticipating this, the sender will choose to send zero as well. Therefore, any positive amount that the sender decides to transfer to the recipient is a (behavioral) measure of the sender’s trust, and any positive amount that the recipient decides to return to the sender is a measure of the recipient’s trustworthiness.

Following the Harvard study, we implement a “blind” procedure where experimenters are not allowed to know the decisions of subjects. Namely, in each step of the game subjects write their decisions on a record sheet, placing it in an envelope with an anonymous code that they had previously chosen. Experimenters do not know the mapping of codes onto subjects’ actual names. However, the Harvard study was conducted in such a way that senders knew the identity of recipients and vice-versa – a condition we henceforth refer to as **face-to-face**, because Harvard subjects who were paired with one another had an opportunity to see one another prior to their experimental transaction. Namely, they were handed a “social connection” questionnaire asking, among other things, the number of personal acquaintances they had in common. Then subjects were separated into two different rooms: one with subjects playing the role of senders, and the other with subjects playing the role of recipients.

We randomly assigned half the subjects to these exact experimental conditions, and half the subjects to another condition involving a “double-blind” procedure originally adopted by Berg, Dickhaut and McCabe (1995). The double-blind procedure guarantees that experimenters *and* participants do not know the actual identity of each other – a condition we henceforth refer to as **anonymous**. Thus, subjects were randomly assigned to the role of sender or recipient as they arrived for the experiment and were sent to separate rooms, without ever seeing their partners.³ In our view, this procedure is more appropriate to validate attitudinal, questionnaire-based measures

2 As in the Harvard study, the trust game is referred to as “the transfer game” in the instructions for participants.

3 In the Berg-Dickhaut-McCabe experiment, any amount transferred from senders to recipients was *tripled* rather than doubled. Glaeser *et al.* (2000) justify their choice of doubling the money as a way to compensate for subjects’ higher incentives to cooperate given that they knew each other. However, this reduces the propensity of senders to transfer money because they will not have much to gain from it. Although we would have preferred to triple the amount sent, we chose to double the amount to carry out comparisons to the Harvard study.

of trust using behavioral data. This is because, upon seeing each other, individuals receive signals that likely influence their subsequent decisions in the experiment. For instance, senders may judge recipients' trustworthiness based on "cheap talk" or physical characteristics (Frank, 1988) in a way that is not controlled by the experimental procedure. Also, subjects may make use of informal retaliation strategies that are unobserved by the experiments: for instance, recipients may be more reluctant to defect if they perceive that senders will apply personal sanctions after the experiment is concluded. As a consequence, senders who declare themselves as trusting in the WVS/GSS scale may behave differently after interacting face-to-face with recipients. Our study, which encompasses both known and unknown partners, potentially controls for this effect.

Another feature of the Harvard study, which is also present in our study, is that half the recipients were given an opportunity to send a promise to the sender, as follows. Prior to the decisions in the trust game, randomly chosen recipients received a sheet where they could choose between two options: (a) making a promise to repay the sender at least as much as what the sender transferred, or (b) making no promise. Recipients were told that the promise was non-binding, and that no other additional message would be allowed. Then senders proceeded with their decisions.

2.3 Envelope drop

After the end of the trust game, subjects had the option to volunteer for an additional experiment, the "envelope drop," which provided us with an additional measure of trust. In the experiment, subjects had to answer individually a series of questions asking whether they would an envelope with their address and containing R\$ 20, which should be dropped by experimenters in a public place within certain pre-specified conditions, or a lower amount of money for sure, in cash.

Subjects filled out 15 tables with 9 lines each. Lines varied the amount of money for sure that subjects could possibly receive (from R\$ 2 to R\$ 18). Presumably, subjects with a lower degree of trust (in the experimenters, in the pedestrians who might make an effort to return the envelope, and in the mail service) should choose lower levels of money for sure instead of the R\$ 20 envelope. Thus, the lowest amount of money that subjects agree to trade for the envelope drop, referred to as their **reservation value**, is an additional indication of their level of trust. Tables, in turn, varied drop conditions: location where the envelope will be dropped, period (day or night), whether the envelope will be sealed and stamped, etc. We tried to match the locations chosen in the Harvard study as close as possible, according to their key characteristics.⁴ As in the Harvard study, we averaged subjects' reservation values across the 15 tables.

To create incentives for truthful responses, for each individual we randomly drew a number from 1 to 9 and another number from 1 to 15, corresponding to a particular line and table of the questionnaire respectively. Depending on the student's choice in that table and line, we ended up either dropping the envelope a couple of weeks later (according to the conditions specified in the table) or providing the student with the corresponding cash. About a month later, we contacted the subjects whose envelope was dropped to verify whether they actually received the envelope or not.

⁴ For instance, a possible location for the envelope drop in the Harvard study was Harvard Square, which is a central place at Harvard University with an intense traffic of people. At the University of São Paulo, a similarly central location with heavy traffic is the place where banks and ATM machines are clustered.

3 RESULTS AND DISCUSSION

3.1 Overview

Table 2 provides a summary of comparative results including both our study and the experiment at Harvard. Only 21,7% of the Brazilian students say that they trust other people, which is significantly lower ($p < 0.01$) than the level reported in the Harvard experiment (42,6%). This difference is consistent with the results from the WVS applied to a larger sample of individuals from both countries (Figure 1), though our Brazilian students apparently show a higher level of self-reported trust than the larger Brazilian sample used in the WVS.

Perhaps not surprising, the amount sent by students in the USP study is significantly higher ($p < 0.01$) in the face-to-face treatment (\$25.71 on average), where subjects knew their partners, than in the anonymous procedure where no such information was available (\$16.88 on average). (We report throughout our results in Brazilian currency, doubling the dollar values from the Harvard study, according to our chosen exchange rate). Through face-to-face interactions, senders can apparently get signals that might increase their trust in particular “types” of recipients, or implicitly make use of informal enforcement mechanisms (e.g., some personal retaliation against a recipient who defected, when they meet again after the experiment). Results presented in the table also indicates that the face-to-face and anonymous treatments do not significantly differ in terms of the trust-related variables WVS/GSS and MRV, thus suggesting that possible differences in observed behavior across these treatments are not merely a result of differences in subjects’ intrinsic propensity to trust. Also, the amount returned by recipients is significantly lower in the anonymous treatment ($p < 0.01$), thus suggesting that some recipients in the face-to-face condition may refrain from acting opportunistically fearing that senders will apply some form of personal retaliation when they meet again after the experiment ends.

Table 2 – Descriptive statistics

| | Harvard Study | USP Study (Brazil) | | |
|---|-------------------|--------------------|--------------------|--------------------|
| | (US) | All Treatments | Anonymous | Face-to-face |
| WVS/GSS (% who affirm to trust others) | 42.6 (3.5) | 21.7 (3.4) | 17.6 (4.6) | 23.2 (5.1) |
| Average amount sent | \$24.80 (9.08) | \$21.36 (10.60) | \$16.88 (10.80) | \$25.71 (8.51) |
| % who sent the maximum value possible (\$30) | 0.71 | 0.55 | 0.32 | 0.77 |
| Average amount returned | \$24.60 (-) | \$19.74 (16.47) | \$13.47 (12.72) | \$25.83 (17.60) |
| Ratio of the amount returned to the amount sent | | 0.42 (0.27) | 0.34 (0.18) | 0.49 (0.31) |
| Average of mean reservation value (MRV) | | \$9.13 (4.55) | \$9.67 (4.63) | \$8.61 (4.44) |

Note: Standard deviations are in parenthesis. Monetary values of the Harvard study were doubled to allow for comparisons to the results of the USP study.

Since Harvard subjects could see each other prior to their interaction, it is more appropriate to compare their results with our results from the face-to-face treatment. Although Brazilian subjects significantly self-report lower levels of trust than students from Harvard, the average amount sent is roughly 80% of the amount initially received by the participants, which is not significantly different from the amount sent by participants in the Harvard study. Likewise, the percentage of participants who sent the maximum amount allowed (\$30) is about the same for the two distinct experiments (71% for the Harvard study and 77% for our study). The average amount returned by Brazilian students in the face-to-face condition (\$25.83) is also very close to the amount returned by Harvard subjects (\$24.60). Thus, we do not have evidence that the Harvard subjects and the USP students assigned to the face-to-face treatment differ in terms of their behavioral propensity to trust or be trustworthy, although they do differ in their attitudinal responses to the WVS/GSS scale.

3.2 Determinants of the amount sent

We next consider the effect of alternative measures of trust on the amount of money sent (Table 3). All regressions include several controls, some of which were also used in the Harvard study: the day when the experiment was conducted (a dummy variable coded 1 if the experiment was conducted in the second day, since sessions were conducted on two different days); the type of treatment (a dummy variable coded 1 if subjects are assigned to the anonymous treatment); the gender composition of the pair (a dummy variable coded 1 if partners are of the same sex); an indicator for cases where senders made a promise to recipients when they were allowed to do so; an indicator for cases where senders were not allowed to make any promise; and several demographic indicators such as gender (dummy coded 1 if subject is male), race (dummy coded 1 if subject is white), academic status (dummy coded 1 if student is a freshman), and an indicator for whether the student is only child or not.

We first focus on the effect of the attitudinal measures of trust. To examine our conjecture that the relationship between attitudinal and behavioral trust should vary depending on whether individuals can see each other or not, we include in the regressions both the main effect of each attitudinal measure and its interaction with the dummy variable coding the anonymous treatment. The main effect of the experimental treatments is as expected: when senders do not know their recipients, they send a lower amount of money than in the face-to-face treatment ($p < 0.05$ and $p < 0.10$ in model (3)). As for the interactions, our previous discussion implies that we should expect a stronger (positive) effect of attitudinal measures in the anonymous condition than in the condition where individuals can meet face-to-face.

Contrary to the results reported by Glaeser *et al.*, the regression models presented in Table 3 show moderately significant effects ($p < 0.10$) for two attitudinal measures of trust, as well as their interactions: WVS/GSS Trust and the Trust Behavior Index (see Table 1 for an explanation of these variables). These interactions, in particular, support our conjecture that the effect of attitudinal measures of trust on actual trusting behavior should be larger in the anonymous treatment. This result is a unique feature of our study, because we validate attitudinal measures of trust within two distinct experimental settings, and show that this distinction matters. Apparently, subjects behave in a way that it is different from what they expressed in questionnaire scales if they have an opportunity to see each other prior to their experimental interaction. Subjects can either act upon signals they would receive after meeting their partners in person, or make use of post-experimental retaliation strategies that are unobserved to the experimenter. Since most survey-based measures of trust refer to people in general, the absence of confounding effects in the anonymous condition provides a more accurate assessment of the effect of attitudinal measures of trust on subjects' trust-

ing behavior. The other trust measures (Trust Index and Trust in Strangers), as well as the Mean Reservation Value (obtained in the envelope drop experiment), show no significant relationship with the amount of money sent by subjects.

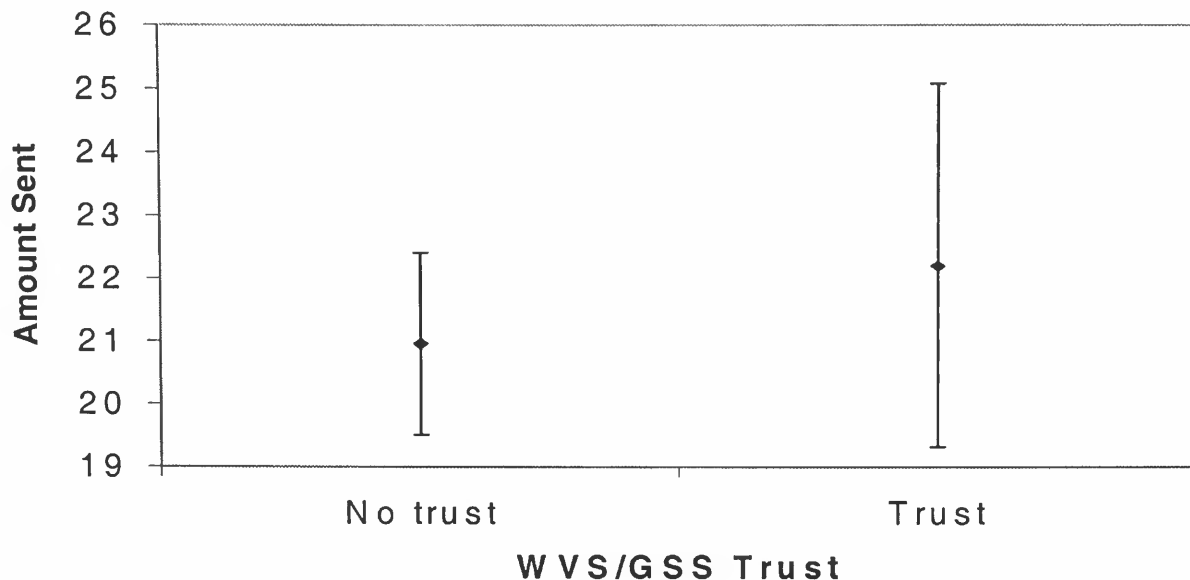
Table 3 – Determinants of the amount sent

| | (1) | (2) | (3) | (4) | (5) |
|--------------------------------|----------------------|---------------------|---------------------|----------------------|----------------------|
| Constant | 21,886** (5,632) | 20,889** (5,825) | 21,173** (7,932) | 20,136** (5,686) | 20,545** (7,476) |
| Day | 6,575** (2,663) | 7,421** (2,591) | 6,606** (2,729) | 6,887** (2,768) | 6,955** (2,597) |
| Anonymous | -12,324** (3,227) | -9,505** (3,255) | -12,947* (6,919) | -11,410** (2,996) | -18,310** (5,782) |
| Pair Is of the Same Sex | -2,833 (2,969) | -3,639 (2,776) | -3,377 (3,102) | -3,854 (2,850) | -2,704 (2,699) |
| Made Promise | 4,775 (3,304) | 4,649 (3,709) | 4,095 (3,486) | 6,668** (3,145) | 5,291 (3,874) |
| Couldn't Make Promise | 3,166 (2,713) | 1,524 (3,147) | 1,230 (2,742) | 5,477* (3,240) | 2,536 (3,840) |
| Man | 4,071 (2,439) | 4,651** (2,283) | 4,317* (2,322) | 5,431** (2,499) | 3,817* (2,249) |
| White | -0,874 (2,295) | -1,341 (2,411) | -1,649 (2,367) | -2,929 (2,384) | -0,435 (2,098) |
| Freshman | -7,750** (3,586) | -7,113* (3,708) | -5,403 (3,269) | -6,214* (3,393) | -4,800 (3,404) |
| Only Child | 0,160 (2,164) | 0,129 (2,261) | 0,140 (2,735) | 0,846 (2,431) | 1,240 (2,754) |
| WVS/GSS Trust | -6,830* (3,927) | | | | |
| WVS/GSS Trust×Anonymous | 10,570* (5,813) | | | | |
| Trust Index | | -1.141 (0,811) | | | |
| Trust Index×Anonymous | | 1,620 (1,173) | | | |
| Trust in Strangers | | | 0.937 (5,308) | | |
| Trust in Strangers×Anonymous | | | 3,970 (7,032) | | |
| Trust Behavior Index | | | | -1,288* (0,676) | |
| Trust Behavior Index×Anonymous | | | | 2,372* (1,254) | |
| Mean Reservation Value (MRV) | | | | | -0,162 (0,511) |
| MRV×Anonymous | | | | | 0,912 (0,574) |
| Adjusted R ² | 0.291 | 0.307 | 0.266 | 0.284 | 0.331 |
| N | 61 | 60 | 61 | 61 | 61 |

Note: OLS estimates. White-corrected standard errors are in parenthesis. ** $p < 0.05$, * $p < 0.10$.

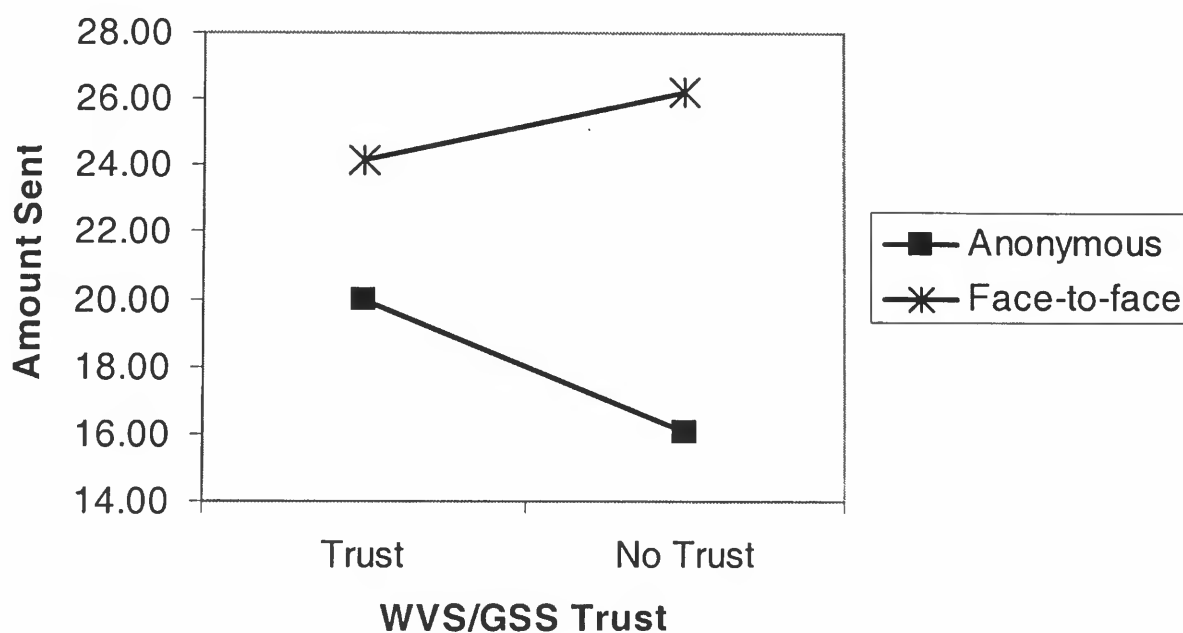
Figures 2 and 3 depict the effects discussed above. Figure 2 shows the relationship between the average amount sent by participants who declare to be non-trusting and the participants who declare the opposite. The difference between the average amount of money sent by subjects within each group is insignificant. Different results appear, however, when we analyze this effect according to our experimental conditions.

Figure 2 – Amount sent according to senders' attitudinal level of trust (95% confidence interval)



As shown in Figure 3, subjects who declare to be non-trusting send significantly less money in the anonymous condition than in the condition where they partners can meet face-to-face ($p < 0.05$). For subjects who declare to trust other people, the difference is insignificant. Apparently, senders who express low trust in the questionnaire tend to behave in a trusting manner if they see their recipients, and refrain from trusting them if the interaction is anonymous.

Figure 3 – Amount sent according to senders' attitudinal level of trust and experimental conditions



We now briefly discuss other significant variables included in the regressions. Subjects who participated in the second day of the experiment were also, for some reason, more trusting ($p < 0.05$). Some demographic variables, notably Freshman and Man, are significant in some models. Models (1), (2) and (4) shows that subjects who just enrolled the university (Freshman equal to 1) send lower amounts to recipients, suggesting that students possibly increase their degree of trust as they evolve in their academic program. The variable Man is significant in all models except model (1), indicating that male subjects appear to have higher propensity to trust. The variables related to the recipient's promise show no significant effect across models, except in model (4). While this result is apparently inconsistent with previous experimental results showing that non-binding promises matter (e.g. Malhotra and Murnighan, 2002), it is not so surprising in our context because recipients' promises were not enforced in any way.

3.3 Determinants of the amount returned

Our next set of results explores the behavior of recipients, employing the ratio of the amount returned to the amount received as a dependent variable (Table 4). As discussed before, we expect that recipients who are known by senders should increase their amount returned fearing that the latter will employ personal sanctions when they meet again after the experiment is concluded. Although simple mean comparisons show significant differences across treatments (Table 2), regressions in Table 4 provide no firm evidence that the ratio is significantly higher when subjects know each other: the variable Anonymous is only significant ($p < 0.05$) in model specification (2), being marginally significant ($p < 0.10$) in model (1). Apparently, anonymous interaction decreases trust but has a weaker effect on trustworthy behavior after we control for some personal characteristics of recipients.

Results from Table 4 also show that recipients who promise to return at least as much as what their partners send significantly return more money ($p < 0.05$). Notice, however, that the dummy variable coded 1 for recipients who could not make any promise is significant as well ($p < 0.05$), and with a coefficient of similar magnitude. This is because the reference group in this case is the set of recipients who had an opportunity to make a promise and chose not to do so; those individuals significantly return less money. Thus, only individuals who refuse to make any promise in fact "stick to their word." Promises are apparently interpreted by recipients as strictly non-binding and hence have no relationship with their subsequent behavior. Demographic variables, as well as the dummy variable coding the day when the session was conducted, do not significantly explain recipients' choices.

The amount sent by the player "sender" is significantly positive ($p < 0.05$) in all cases except in the regression specification (3), where it is marginally significant ($p < 0.10$). This result indicates that the higher the amount of money sent, the higher the amount returned, thus suggesting that subjects are driven by reciprocity concerns: a recipient who is granted trust is inclined to honor the sender's trust. (Berg *et al.*, 1995).

Concerning our measures of trust, we find that the GSS/WVS Trust and the Trust Index significantly affect the amount returned by recipients ($p < 0.05$). Thus, a person who declares to trust other people returns a more money than a person who declares otherwise (see Figure 4). This result is aligned with the Harvard study: attitudinal measures of trust also appear to predict trustworthiness. Namely, recipients who declare to be more trusting are actually more inclined to honor the sender's trust. Apparently, subjects use their own propensity to be trustworthy when judging the propensity of others. It is interesting to note, however, that the attitudinal measures of trustwor-

thiness – Self-reported Trustworthiness and Honesty Index (see Table 1) – are insignificant, thus indicating that, in our context, these measures are poor predictors of subjects' trustworthy behavior.

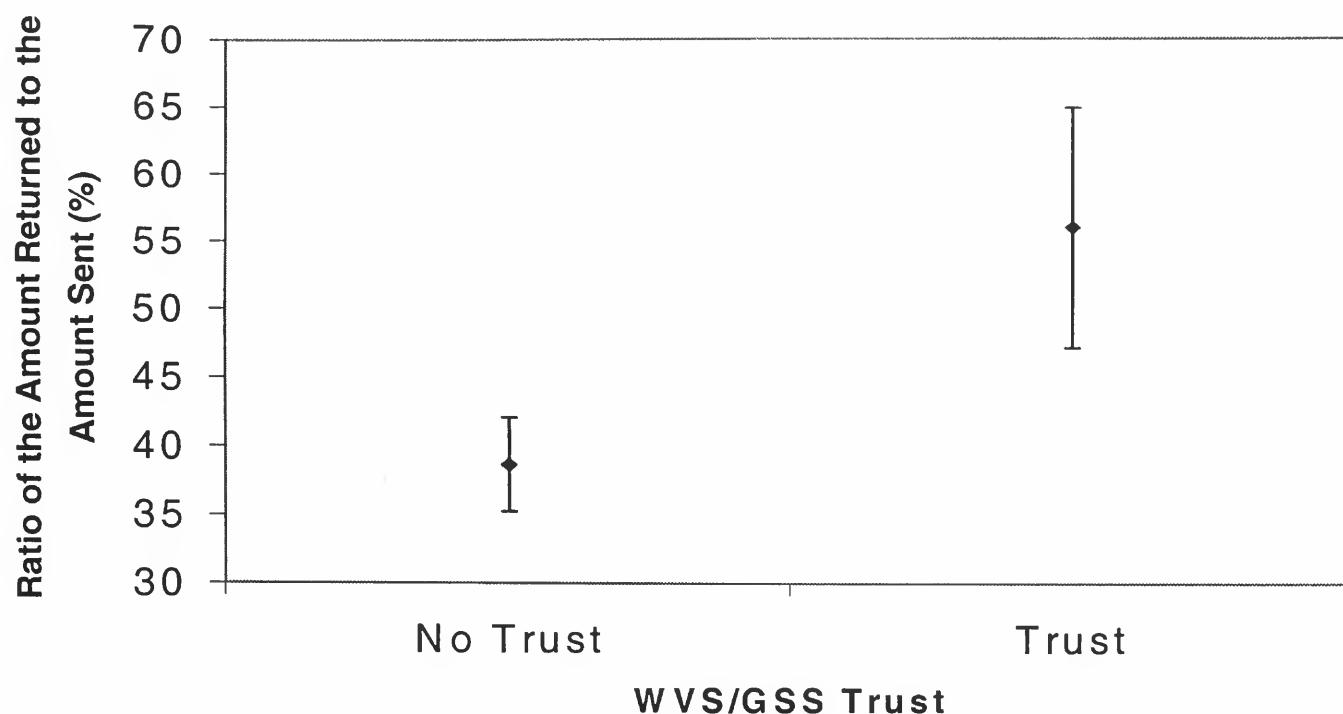
Table 4 – Determinants of the ratio of the amount returned to the amount received

| | (1) | (2) | (3) | (4) |
|-------------------------------|--------------------|---------------------|--------------------|--------------------|
| Constant | 0,035 (0.174) | 0,101 (0.182) | 0.258 (0.316) | -0.250 (0.224) |
| Day | -0.046 (0.074) | -0.014 (0.080) | -0.028 (0.078) | 0.029 (0.089) |
| Anonymous | -0.164* (0.090) | -0.192** (0.091) | -0.135 (0.095) | 0.141 (0.092) |
| Pair Is of the Same Sex | -0.087 (0.093) | -0.122 (0.097) | -0.048 (0.098) | -0.034 (0.098) |
| Made Promise | 0.241** (0.112) | 0.251** (0.113) | 0.255** (0.119) | 0.367** (0.142) |
| Couldn't Make Promise | 0.249** (0.106) | 0.236** (0.108) | 0.245** (0.113) | 0.388** (0.132) |
| Man | 0.045 (0.078) | 0.037 (0.080) | 0.021 (0.083) | 0.094 (0.089) |
| White | -0.002 (0.081) | 0.014 (0.086) | 0.030 (0.086) | 0.047 (0.089) |
| Freshman | 0.146 (0.091) | 0.127 (0.090) | 0.068 (0.092) | 0.108 (0.090) |
| Only Child | 0.068 (0.127) | 0.052 (0.126) | 0.058 (0.136) | 0.069 (0.126) |
| Amount Sent | 0.010** (0.005) | 0.010** (0.005) | 0.010* (0.005) | 0.012** (0.006) |
| WVS/GSS Trust | 0.224** (0.087) | | | |
| Trust Index | | 0.047** (0.016) | | |
| Self-reported Trustworthiness | | | -0.041 (0.046) | |
| Honesty Index | | | | 0.026 (0.037) |
| Adjusted R^2 | 0.245 | 0.269 | 0.143 | 0.250 |
| N | 55 | 53 | 55 | 48 |

Note: OLS estimates. White-corrected standard errors are in parenthesis.

** $p < 0.05$, * $p < 0.10$.

Figure 4 – Ratio of the amount returned to the amount sent, according to recipients' attitudinal level of trust (95% confidence interval)



3.4 Envelope drop results

Regressions in Table 5 examine the effect of subjects' personal characteristics on their mean reservation value (MRV) in the envelope drop experiment. Although most variables are insignificant across alternative model specifications, the indicator variable for white subjects shows a negative and significant impact on the mean reservation in some regressions ($p < 0.05$). Thus, white subjects appear to be less trusting: they are willing to trade the \$20 envelope for lower amounts of money for sure than other subjects.

Some attitudinal scales have some role in predicting subjects' MRV in the envelope drop experiment, although with marginal significance ($p < 0.10$). Thus, the WVS/GSS trust measure is positively associated with MRV, as well as a variable called Pro-transfer (also used in the Harvard study), which measures subjects' propensity to favor redistribution to the poor.⁵ A possible explanation for the role of this variable in explaining subjects' MRV is that "dropping the envelope itself is seen as an act of charity" (Glaeser *et al.*, 2000, p. 829), thus increasing the willingness of individuals with redistribution concerns to accept the envelope.

5 Measured according to the following agreement scale: "Personal income shouldn't be determined by work".

Table 5 – Determinants of the mean reservation value (MRV)

| | (1) | (2) | (3) | (4) | (5) |
|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Constant | 9.830** (1.032) | 10.347** (1.086) | 10.661** (1.324) | 10.089** (1.042) | 7.830** (1.596) |
| Man | 0.826 (0.921) | 0.743 (0.969) | 0.923 (0.934) | 1.032 (0.946) | 1.083 (0.941) |
| White | -2.328** (0.977) | -2.241** (1.042) | -2.247** (0.989) | -2.197** (0.995) | -2.553** (1.011) |
| Freshman | 0.255 (1.070) | 0.035 (1.111) | -0.105 (1.081) | -0.112 (1.111) | 0.127 (1.114) |
| Only Child | 0.904 (1.923) | 0.811 (1.968) | 0.968 (1.967) | 0.688 (1.981) | 0.469 (1.971) |
| WVS/GSS Trust | 2.003* (1.038) | | | | |
| Trust Index | | 0.275 (0.197) | | | |
| Trust in Strangers | | | -0.646 (0.979) | | |
| Trust Behavior Index | | | | -0.067 (0.220) | -0.018 (0.221) |
| Pro-transfer | | | | | 0.891* (0.482) |
| Adjusted R^2 | 0.037 | 0.021 | 0.009 | 0.006 | 0.026 |
| <i>N</i> | 121 | 117 | 121 | 121 | 120 |

Note: OLS estimates. White-corrected standard errors are in parenthesis.

** $p < 0.05$, * $p < 0.10$.

One interesting fact from the envelope drop experiment is that, about a month after the completion of the experiment, we contacted by phone all participants whose envelope was dropped. We asked them whether they received the envelopes. All subjects reported that they did not receive the envelope. On the one hand, this may mean that Brazilians' apparent disbelief in the trustworthiness of others is warranted. On the other hand, the Brazilian Post Service has a rule that prohibits sending cash by mail, even though we used opaque envelopes. Unfortunately, we cannot ascertain the precise cause of why most subjects have not received their envelopes.

4 CONCLUDING REMARKS

Attitudinal measures of trust, such as the WVS/GSS scale, have been shown to be correlated with important country-level variables reflecting economic and institutional development (e.g. Knack and Keefer, 1997; La Porta *et al.*, 1997; Zak and Knack, 2001). An important research agenda, in this sense, is to assess what exactly those scales measure. Following the idea advanced by Glaeser *et al.* (2000), we provide in this study a validation of attitudinal measures of trust based on

behavior measures of trust obtained from experimental sessions involving monetary transfers in the context of a “trust game”. (Berg *et al.*, 1995).

Although the overall thrust of our study is not strictly new, our test differs from Glaeser’s *et al.* in two important ways. First, we examine whether attitudinal measures of trust explain trusting behavior not only when interacting individuals can see each other (the design employed by Glaeser *et al.*), but also when they cannot see each other. In the first case, responses may be affected by signals and social interactions (unobserved to the experimenters) that may attenuate the correlation between attitudinal and behavior measures of trust. Supporting this conjecture, we find that the effect of attitudinal measures of trust on subject’s trusting behavior vary according to the social context involved in the experiment. Namely, the association between subjects’ trusting attitudes and their actual behavior in the experiment appears to be larger when paired subjects cannot see each other prior to their interaction.⁶ Additionally, in line with the Glaeser *et al.* study, we also find that attitudinal measures of trust explain trustworthy behavior: individuals who affirm to be more trusting are actually less inclined to act opportunistically.

Second, we run experiments in a country that has systematically exhibited the lowest level of trust according to the WVS/GSS measure: Brazil (see Figure 1). Since we tried to replicate Glaeser’s *et al.* protocols as close as possible, we are able to perform an exploratory cross-country comparison between Brazil (our study) and the United States – having in mind that this kind of comparison has clear limitations.⁷ Although Brazilian subjects report significantly lower levels of trust than American subjects according to the WVS/GSS scale, their experimental responses do not significantly differ in terms of both the amount sent and the amount returned by recipients. We note, however, that the Glaeser *et al.* experiment involved only face-to-face interactions. Our finding that the relationship between the WVS/GSS scale and subjects’ behavior varies across our experimental treatments suggests that this conclusion would probably be different if the comparison were carried out in settings involving anonymous interaction. Future research should attempt to perform such comparisons using different experiment conditions.

A natural question is whether the very low level of self-reported trust in Brazil according to the World Values Survey (Figure 1) really means that Brazilians are non-trusting citizens. Our study indicates that Brazilians may be not only less inclined to trust (given the results of the experiment in the anonymous condition), but also less inclined to act in a trustworthy manner. Apparently, subjects use their own propensity to act in an opportunistic manner when judging the propensity of others. What then can account for the low levels of trust and trustworthiness in Brazil?

A possible explanation is that, when answering whether they “trust” or not people in general, respondents may simply be expressing their perception of the institutional environment of the country leading to more or less cooperation. In fact, the inefficiency of the Brazilian law system is well documented (e.g. Stone, Levy and Paredes, 1996). There is also evidence that Brazilians express negative attitudes regarding their judicial system. (Pinheiro, 2001). This explanation is consistent with Zak and Knack’s (2001) finding that the WVS/GSS trust measure is positively correlated with several measures of the strength of formal enforcement institutions, thereby suggesting that institutional efforts to reform the judicial system in Brazil might have sizable payoffs. Increasing the effectiveness of the legal sector should reduce the perception of contractual hazards, which should prompt trust, and increase the likelihood of contractual enforcement, which should promote trustworthiness. A reduction in transaction costs should follow, causing a spur in econom-

6 In an independent study, Bellemare and Kröger (2003) also evaluate the relationship between attitudinal and behavioral measures of trust and find a significant and positive correlation.

7 For instance, neither Harvard students nor our subjects are representative of the overall population in each country. Also, we have not controlled for “experimenter effects,” as cross-country differences may be due, in part, to different operational procedures and personal characteristics of researchers who implemented the experiment in each country. (Roth *et al.*, 1991).

ic activity. (De Soto, 2002). Credit markets, for instance, are heavily dependent on the ability of lenders to secure future payment; the supply of credit is, therefore, an act of trust. Initiatives in Brazil to increase lender protection (such as in the event of firm bankruptcy) are, therefore, welcome.

Another possible explanation is based on cultural issues. Thus, when answering whether they trust "people in general," respondents may provide assessments based on stereotypes of the Brazilian culture such as the "malandro": a person who is supposed to achieve social status solely by acting in his or her self-interest. (DaMatta, 1991). This explanation, however, has two sorts of problems. First, the emergence of such stereotypes may be, in part, due to the lack of strong formal institutions that penalize cheating. It is difficult to ascertain whether low trust is due to country-specific values and norms, or simply due to weak law enforcement. Second, and perhaps more importantly, the policy implications of such explanation are difficult to ascertain. Changing culture and social norms is particularly difficult because such informal institutions are typically path-dependent, that is, they slowly evolve over time and are heavily influenced by initial conditions (e.g. North, 1990). Restoring trust in Brazil may require, in practice, improvements in formal enforcement mechanisms (e.g. Zucker, 1986; De Soto, 2002).

We stress, however, that our study has important limitations. As is customary in controlled experiments, the sample size is small and not representative of the populations under consideration. Our validation of attitudinal measures of trust does not take into account heterogeneity in terms of income, education, and region. A possible way to deal with this problem in future studies is to carry out more representative samples, possibly mixing experimental with survey-based techniques (e.g. Bellemare and Kröger, 2003). Also, the comparisons between our study and the Glaeser *et al.* study in the United States are certainly limited by differences in experimental conditions and sample characteristics, even though we tried to replicate their experiment as close as possible. Future comparative studies should control for the different experimental conditions that might occur in the distinct countries where subjects are being recruited (e.g. Roth *et al.*, 1991). More studies along the lines of validating attitudinal measures of trust and other social variables of economic interest, using larger samples and refining the methods to promote cross-country comparisons, are certainly needed.

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