Trust under the Prospect Theory and Quasi-Hyperbolic Preferences: A Field Experiment in Vietnam

Quang Nguyen, Marie Claire Villeval, Hui Xu

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QUANG NGUYEN
Middlesex University

MARIE CLAIRE VILLEVAL
University of Lyon, CNRS GATE, and IZA

HUI XU
Beijing Normal University and GATE

> Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence. (Arrow 1972)

I. Introduction

A large literature has shown that trust contributes to growth and development, political success, and social well-being (Knack and Keefer 1997; La Porta et al. 1997; Zak and Knack 2001; Guiso, Sapienza, and Zingales 2009; Algan and Cahuc 2010). Trust reduces transaction costs dramatically and contributes to the efficiency of economic organizations (Fukuyama 1995). In contrast, low trust increases demand for regulation (Aghion et al. 2010), and low levels of trustworthiness hinder the development of social capital necessary for eco-

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nomic development (Neace 2004). Trust and trustworthiness are also necessary for democratization (Tilly 2005). Better understanding their determinants is therefore fundamental.

In this article, we investigate how trust and trustworthiness relate to risk aversion, loss aversion, and time preferences, by conducting an artifactual field experiment in villages in the north and the south of Vietnam. We use a game in which trust is proxied by the amount sent by a trustor to an anonymous trustee. In contrast with the standard game of Berg, Dickhaut, and McCabe (1995) but like in Buchan, Johnson, and Croson (2006), the trustee can send back any amount of his total wealth (i.e., the tripled amount received from the trustor and an initial endowment). We can use the percentage of total wealth returned to the trustor as a proxy of trustworthiness. The novel contribution of our approach is that we do not study risk attitudes in the framework of the expected utility (EU) theory, in contrast with most of the previous literature on trust, but we use instead the tools provided by the prospect theory to have a more precise understanding of the individual underpinnings of social preferences. Another novelty of our approach is that we consider the possible links between trust and time preferences. So far, no study has investigated this link, although we suspect that individuals' intertemporal preferences may affect their attitudes in the trust game.

Although trusting behavior has been widely studied either through value surveys or experimentally (Glaeser et al. 2000), there is no consensus on its links with basic human preferences (Camerer 2003; Fehr 2009). Both behavioral studies (Andreoni and Miller 2002; Cox 2004; Ashraf, Bohnet, and Piankov 2006) and neuroscientific studies (Kosfeld et al. 2005; Baumgartner et al. 2008) have shown that social preferences, notably betrayal aversion (Bohnet and Zeckhauser 2004; Bohnet et al. 2008), play a major role in trusting behavior. But this does not exclude a role of risk preferences in trusting behavior (Ben-Ner and Putterman 2001; Cook and Cooper 2003). Indeed, trusting others means making oneself vulnerable to a counterpart who can decide to reciprocate or betray, which creates uncertainty. For example, Karlan (2005) and Schechter (2007) have found that higher trust correlates with less risk aversion, even after controlling for altruism (see also Fehr 2009; Naef and Schupp 2009). In contrast, Eckel and Wilson (2004), Ashraf et al. (2006), Houser, Schunk, and Winter (2010), and McEvily, Radzevick, and Weber (2012) have found no correlation between trust and risk attitudes.

The unclear link between risk attitudes and trusting behavior in the literature is possibly because most measures involve lotteries that may not capture the attitudes toward strategic uncertainty. Moreover, many studies do not elicit individual risk preferences but simply compare the distributions of decisions in

trust and risk games (Houser et al. 2010).[1] Finally, the studies that elicit individual risk attitudes usually assume that individuals behave according to EU theory and only characterize risk preferences by choices of lotteries in the domain of gains.[2] Yet, this assumption has been frequently challenged, and the prospect theory offers a richer approach to risk attitudes (Kahneman and Tversky 1979; Tversky and Kahneman 1992; Wakker 2010). EU theory may be inadequate if participants evaluate the possible outcomes of their decisions relative to a reference point or if there is an endowment effect. One can hypothesize that loss averse individuals are less willing to trust others because sending money to a trustee without any guarantee of return may entail a loss in income; if people are loss averse, analyzing the link between trust and risk preferences only on the basis of the concavity of the utility function will bias the estimates. For that reason, we expand the measurement of risk preferences to incorporate prospect theory like in Tanaka, Camerer, and Nguyen (2010).[3] We measure the correlation between trust and the curvature of the utility function, nonlinear probability weighting, and loss aversion.[4]

We also provide the first analysis of the links between behavior in the trust game and time preferences. Our intuition is that in real life settings, more patient people may be more likely to behave in ways that preserve long-term mutually beneficial relationships, while more impulsive people may not be able to resist the temptation of behaving selfishly. We hypothesize that self-control (captured by the present bias parameter) and future orientation may motivate individuals to send more and to return more, instead of taking profits

[1] In Ashraf et al. (2006), people make choices between a risky gamble and a deterministic payoff. In the risk game of Schechter (2007) and McEvily et al. (2012), players choose the amount of a bet for which return depends on the roll of a die. Snijders and Keren (1999) measure risk by varying the payoff structure in the trust game. Bohnet and Zeckhauser (2004) and Bohnet et al. (2008) compare behavior facing social risk and state risk.

[2] In Eckel and Wilson (2004), risk attitudes are elicited through choices between lotteries. But if these attitudes do not predict behavior in the trust game, they also do not predict decisions in their risk game in which subjects choose between lotteries and certain amounts. Houser et al. (2010) also elicit individual risk attitudes with the Holt and Laury (2002) procedure and show that they predict behavior in risk games but not in trust games. Karlan (2005) proxies risk attitudes with comparisons of the participants' borrowings and savings in a microcredit program.

[3] In contrast to Tanaka et al. (2010), we first play the risk preferences experiment to avoid having payments from previous games affect the reference point in prospect theory. We also decrease the number of binary choices in the risk experiment, to facilitate the participant's comprehension.

[4] Bohnet, Herrmann, and Zeckhauser (2010) also study the role of reference points for trustworthiness on gain/loss utility from trusting behavior, by eliciting the minimum acceptable probability of trustworthiness that makes the subjects just willing to trust a stranger and by comparing it with the minimum acceptable probability for an equivalent gamble. In contrast, we cannot compare the reference point for trusting and for gambling directly, but we estimate the value of each parameter of the prospect theory precisely.

right away. From a theoretical perspective, studies have shown that it is too restrictive to measure time preferences by an exponential discount rate (see Laibson 1997; O'Donoghue and Rabin 2001; Tanaka et al. 2010). For that reason, we estimate a quasi-hyperbolic function following Benhabib, Bisin, and Schotter (2010) and relate discounting rate and present bias to trustors' and trustees' decisions.

Finally, since trust and the institutional structure of a country may be strongly tied together (Knack and Keefer 1997; Hardin 2002), we conducted the experiment in two regions of the same country that are characterized by a different political and economic history.[5] We analyze whether the effects of risk and time preferences on behavior in the trust game differ in the north and the south of Vietnam. The ability to compare different institutional settings in the same country gives our study a high degree of control compared to cross-country studies (like in Ockenfels and Weimann 1998 or Brosig-Koch et al. 2011).[6] Another strength of our study is that our participants come from villages with a wide range of average incomes. The use of detailed survey data to control the design (by stratifying samples) and to link survey results to experimental results is a rare feature for this kind of study.

Our main findings show that trustors' decisions are positively affected by the expectation of a higher return from the trustee. We do not find any effect of concavity of the utility function, loss aversion, and present bias on the amount sent to the trustees. Yet, higher time discounting increases this amount in the south subsample, and probability weighting decreases it in the north subsample. Time discounting and loss aversion do not influence trustees' behavior, but more risk-averse and less present-biased trustees return a higher share of their wealth to the trustor. Thus, using the approach of the prospect theory and

[5] The north of Vietnam has a much longer communist history than the south since its establishment in 1945, while South Vietnam was under the French and then the US regime between 1945 and 1975. The two states were merged in 1975 and unified politically as the Socialist Republic of Vietnam. Since 1986, the country has initiated market-oriented economic reforms. Therefore, the north followed a Soviet-style model of central planning for a long period (1954–75)—whereas the south followed a market economy during that same period. Differences in the history of communism in the two regions could influence individual's beliefs and expectations. Fox and Joiner (1964) conducted a survey in the south before the unification and observed animosity toward northerners. By 1986, less than 6% of the farmers in the south participated in cooperatives, compared to 95% in the north (Pingali and Xuan 1992; Xuan 1995). We expect that such differences in market exposure would relate to differences in trusting behavior between northern and southern participants in our study.

[6] The literature includes many cross-country comparisons on trust (Yamagishi, Cook, and Watabe 1998; Carpenter, Daniere, and Takahashi 2004; Ashraf et al. 2006; Bohnet et al. 2008, 2010), but within-country comparisons are relatively rare (Ockenfels and Weimann 1998; Bahry and Wilson 2004; Tanaka et al. 2010; Brosig-Koch et al. 2011; see also Alesina and Fuchs-Schündeln 2007, on redistributive preferences).

of hyperbolic time discounting allows us to identify aspects of the relationships between trust and risk and time preferences that could not be uncovered by previous studies using the framework of the EU theory. Important regional differences are also found, with people in the north holding more pessimistic expectations on others' trustworthiness and behaving less reciprocally than people in the south. These behavioral differences may result from long-lasting institutional differences and a longer market integration in the south, which may have favored norms of reciprocity.

In the remainder of this article, Section II describes the experimental design and procedures. Section III analyzes the results, and Section IV concludes.

II. Experimental Design and Implementation

A. The Three Tasks

In this experiment like in Tanaka et al. (2010) each session was composed of three different decision-making tasks, performed in sequence: a risk elicitation task, a time preference elicitation task, and a trust game.[7] Since our study focuses on trust, we present first the trust game before introducing the other tasks. All the instructions can be found in appendix 1, available online.

The Trust Game

Our trust game is played under the strategy method.[8] All the players act first as trustors (player A) and then as trustees (player B). Each player is initially endowed with KVND 20.[9] In the first stage, the trustor decides how much of his endowment to send (x) to the trustee, among the following choices: KVND 0, 5, 10, 15, and 20. This restricted number of options aims at simplifying the game. The amount sent is multiplied by three before it reaches the trustee, to create positive externalities. Like in Eckel and Wilson (2004) and in Ashraf et al. (2006), we ask the trustor to report how much return he expects from the trustee conditional on the amount he sent to him, as we expect that part of trust is calculative (Hardin 2002). For simplicity and to avoid hedging, we do not incentivize belief elicitation.

[7] We always ran the trust game at the end of the sessions because it is the most difficult game to play. Thus, we cannot control for order effects, but we thought that it was more important to facilitate the subjects' understanding.

[8] In their survey, Brandts and Charness (2011) show that in this type of game the strategy method produces similar behavior to the direct-response method. This is confirmed by the meta-analysis of Johnson and Mislin (2011a, 2011b).

[9] VND refers to Vietnamese dongs; K represents thousand. On average, the mean daily income for unskilled work in Vietnam in 2010 was around KVND 35 (around US$2). Both players receive the same endowment, so that they are ex ante equal in terms of experimental wealth.

In the second stage, all players act as trustees and have to decide how much they are willing to return to the trustor (y) for each possible amount sent by the trustor. We keep constant the order in which subjects made decisions for facilitating their understanding. Like in Buchan et al. (2006) the trustees can return any share of their total wealth (i.e., the tripled amount received from the trustor plus the endowment) to the trustor. This is different from the standard trust game of Berg et al. (1995) in which trustees can only send back a share of the amount received from the trustor. From a theoretical perspective, however, the two designs deliver the same predictions regarding both the trustee's and trustor's behavior (see app. 2, available online). In order to facilitate the calculation of payoffs, participants are given tables with examples for each possible amount sent.

Before the game starts, each participant is given randomly a tag colored either red or white. At the end of the game once all players have made their decisions in both roles, we toss a coin. If head comes up, the participants with red tags are assigned the role of the trustor, and those with white tags the role of the trustee. We pair players randomly, and we implement the players' actual decisions corresponding to their role. The final payoff of the trustor is $(20 - x + y)$ and that of the trustee is $(20 + 3 \times x - y)$.

Elicitation of Risk Preferences

To measure the three parameters that characterize risk attitudes in the prospect theory (utility concavity, probability weighting, and loss aversion), we ask participants to make decisions in three series of paired lotteries including respectively 12, 14, and seven questions (see app. 1). Each question is a choice between two binary lotteries, A or B. Each decision is made by choosing a reward with a certain probability represented by a number of balls, with each ball marked by a number from 1 to 10. In the first series, plan A is fixed at KVND 40 with probability 0.3 and KVND 10 with probability 0.7. Plan B is half fixed and half changing. The payoff is always KVND 5 with probability 0.9, and, as one moves down the rows, the payoff is from KVND 68 to 600 with probability 0.1. Series 2 is similar, but with different payoffs and probabilities. Plan A is always fixed, at KVND 40 with probability 0.9 and KVND 30 with probability 0.1. In plan B the payoff is KVND 5 with probability 0.3 and, moving down the rows, from KVND 54 to 130 with probability 0.7. In series 1 and 2, individuals are expected to choose plan A in the first row and, as the high-potential payoff increases in plan B down the rows, to switch to preferring B to A. A risk-averse person should switch later than a risk-neutral one.

To address loss aversion, series 3 involves both gains and losses in plans A and B. In either plan the probabilities of gains and losses are the same: 0.5.

The differences between plan A and plan B lie in two points. First, in plan B, the gains and losses are all much larger than in plan A. Second, in plan B, gains are always KVND 30, while the amount that can be lost decreases from KVND 21 to 11, as one moves down the rows. In plan A, the amount of gains decreases and the amount of losses increases across rows, with the gains varying from KVND 5 to 1 and the losses varying from KVND 4 to 8. The later they switch from A to B, the more averse individuals are to losses.

In all three series, we enforce monotonic switching by asking participants at which question they would "switch" from plan A to plan B. They can switch starting with the first question, and it is made clear in the instructions that they do not have to switch at all if they do not want to. After completing the three series of questions, a participant is selected to draw a numbered ball from a bingo cage with 33 numbered balls, to determine which row of choice will be played for real money. Then, we put 10 balls in the cage. Another participant selected as before draws one ball randomly to determine the outcome of the lottery.

We use cumulative prospect theory (Tversky and Kahneman 1992) and the one-parameter form of Prelec's axiomatically derived weighting function (1998). The expected prospect value over binary prospects consisting of outcome x with probability p and outcome y with probability q is represented as $U(x, p; y, q)$. Given this setup, we define the prospect theory utility as follows:

$$U(x,p;y,q) = w^{+}(p+q)v(x) + w^{+}(q)(v(y) - v(x)) \text{ if } 0 < x < y, \quad (1)$$

$$U(x,p;y,q) = w^{-}(p+q)v(x) + w(q)^{-}(v(y) - v(x)) \text{ if } y < x < 0, \quad (2)$$

$$U(x,p;y,q) = w^{-}(p)v(x) + w^{+}(q)(v(y)) \text{ if } x < 0 < y, \quad (3)$$

where $v(x)$ denotes the power value function, with

$$v(x) = x^{\sigma} \text{ for } x \geq 0, \quad (4)$$

$$v(x) = -\lambda(-x^{\sigma}) \text{ for } x < 0, \quad (5)$$

$$w(p) = \exp[-(-\ln p)^{\alpha}], \quad (6)$$

where σ represents the concavity of the power value function and indicates increasing or decreasing marginal value of money. In the domain of gains, an individual is considered risk neutral if $\sigma = 1$, risk averse if $\sigma > 1$, and a risk lover

if $\sigma < 1$. Parameter λ represents the degree of loss aversion, with higher values of λ associated with higher loss aversion. The probability weighting function is linear if $\alpha = 1$ (as in the EU theory). If $\alpha > 1$, the weighting function is S-shaped (the individual underweights small probabilities and overweights large probabilities). If $\alpha < 1$, it is inverted S-shaped (the individual overweights small probabilities and underweights large probabilities). We use Prelec's weighting function because it is flexible enough to accommodate the cases in which individuals have either inverted-S- or S-shaped weighting functions and has fit previous data reasonably well. If $\alpha = 1$ and $\lambda = 1$, the EU theory is not rejected.

Tables A1 and A2 in appendix 3, available online, present the predicted values of the parameters for the curvature of the utility function (σ) and for the probability sensitivity in Prelec's weighting function (α) for all possible combinations of switching points in series 1 and 2.[10] Similarly table A3 in appendix 3 presents the estimates of the ranges of the loss aversion parameter, λ, for three possible values of σ (0.2, 0.6, and 1).

Elicitation of Time Preferences

To measure the quasi-hyperbolic discounting parameters that characterize time preferences (time discounting and present bias), we ask participants to make 75 decisions between receiving money either tomorrow or at specified times in the future (see app. 1). Each question is a choice between plan A that offers smaller rewards tomorrow ("Receive VND *x* tomorrow") and plan B that offers larger rewards some time in the future ("Receive VND *y* in *t* days"). We use 15 combinations of *y* and *t* that define 15 types of plan B. For each *y*, *t* combination, *x* increases as rows move on, equaling 1/6, 1/3, 1/2, 2/3, and 5/6 of the value of *y*. In other words, in each type of plan B, plan A changes with an increasing payoff across five choices. The rewards *x* and *y* vary between KVND 5 and 250 and between KVND 30 and 300, respectively. The time delay *t* varies from 3 days to 3 months. In plan A the payment date is tomorrow, so that regardless of the plan, the participants have to come back to receive their earnings. The earlier switchers from B to A are less patient. Our design is therefore different from Tanaka et al. (2010) in which the early date is today. If participants have any doubt about the certainty of future payoffs, they may prefer plan A not because they are impatient but because they do not trust the experimenters on receiving money in the future or because they

[10] Suppose a participant switched from plan A to plan B at the second question in series 1 and third question in series 2. The lower and higher bounds for σ are 1.16 and 1.29, and the lower and upper bounds for α are 0.56 and 0.64. The mean values of lower and upper bounds indicate that the value of σ (α) for this participant is 1.2 (0.6).

want to minimize transaction costs. In our design, no payment for this task can be made immediately, and only the time lag between the two options can vary. Therefore, the preference for either the early or the later payment should only reveal intertemporal preferences.

In all 15 sets of five questions, we enforce monotonic switching by asking participants at which question they would "switch" from plan B to plan A. After all participants completed the 75 questions, we put 75 balls into a bingo cage, and one ball is randomly drawn by a participant to select a question that will determine how much money they earned and when this money would be delivered. We then ask the participants to discuss about to whom the money should be entrusted until they pick it up on the delivered date (village heads, commune officers, etc.). For each participant, we put the money they earned in an envelope and wrote down their name, the amount they should receive, and the date they should pick it up from the entrusted person. The entrusted person would keep all the envelopes until the pickup date.

These pairwise choices permit estimation of the three-factor model developed by Benhabib et al. (2010). The model values a reward of y at time t according to $yD(y, t)$, where

$$y\mathrm{D}(y,t) = y \ \text{ if } \ t = 0, \tag{7}$$

$$y\mathrm{D}(y,t) = \beta(1-(1-\theta)rt)\,\frac{1}{1-\theta}\,y \ \text{ if } \ t > 0. \tag{8}$$

The three factors r, β, and θ separate conventional time discounting (r), present bias (β), and hyperbolicity (θ) of the discount function $D(y, t)$.[11] Tanaka et al. (2010) show that including all behavioral parameters does not improve the model fitness significantly. For the purpose of this study, we assume θ equal to 1 and estimate β. Our model specification for time preferences is thus based on the quasi-hyperbolic discounting framework. A higher value of β means that the individual is less present biased.

[11] Andersen et al. (2008) and Andreoni and Sprenger (2012) have pointed out that the estimates of time preferences can be biased if one assumes risk neutrality. Using the same data as Tanaka et al. (2010), Nguyen (2011) has applied a structural approach to jointly estimate risk and time preference parameters. These estimates were very similar to those in Tanaka et al. (2010). Given this finding, we apply here the same estimation method as Tanaka et al. (2010). We have, however, reestimated our parameters using the maximum simulated likelihood approach. We found that only the discount rate and the loss aversion parameters in the south were (weakly) significantly different between the two estimation methods.

B. Conjectures

Conjecture 1: Both risk aversion ($\sigma > 1$) and loss aversion (higher λ) affect negatively the amount transferred to the trustee because there is a probability that some trustees keep the money transferred for themselves. There is no conjecture as regards the link between the shape of the probability weighting function (given by α) and trust.

Conjecture 2: The proportion of total wealth returned by the trustee could be reduced by loss aversion, since it represents a loss for the trustee if the reference point is the money he has received from the trustor. It should be affected neither by risk aversion nor by the shape of the probability weighting function since there is no uncertainty associated with the return decision.

Conjecture 3: Patience (measured by a lower discount rate r and lower present bias, i.e., a higher value of β) affects positively the amount transferred by the trustor if we assume that long-term planning and lower impulsiveness are more likely to support the social norm of cooperation.

Conjecture 4: Patience increases the proportion returned by the trustee since not keeping the amount received for one's own benefit requires self-control and future orientation.

C. Experimental Procedures

We conducted our field experiment in eight villages in Vietnam: four villages of two provinces in the north and four villages of two provinces in the south.[12] We collected data from 166 participants in total, 87 participants in the north and 79 participants in the south.[13] A typical lab-in-the-field experiment like ours may potentially face two types of selection bias: the selection of households and the selection of family members as participants in our experiment. To limit the first source of bias, we invited members of all the households who were interviewed during the 2002 Vietnam Household Living Standard Surveys (VHLSS 2002). Research coordinators from the Vietnam Institute of Economics helped in contacting local government officials and asked them to invite the head of each of the 25 households that were involved in the 2002 survey to participate in our experiment. The participation rate was high since 21 individuals participated in each village. The average missing households did not participate mainly because of their relocations to other places.

[12] In the north (Red River Delta), the villages are Yen Lac Truang and Yen Lac Lienchau in Vinh Phuc province and Thai Hoa and Diem Dien in Thai Binh province. In the south (Mekong Delta), the villages are Thot Not and Co Do Trung in Can Tho province and TraVinh Thanh and Phuoc Hao in TraVinh province. These villages are different from those surveyed by Tanaka et al. (2010). We ran one session in each village to avoid contamination effects.

[13] One commune in the north and one in the south had an odd number of observations. In these two communes, we asked a research assistant to participate in the trust game so that all participants could be paired. Of course, we do not include the data from the research assistants in the analysis.

As regards the second source of bias, we acknowledge that we have no control on how the individual was selected within each household. We compare statistics on age, gender, education, and income of actual participants and invited participants. We find that in the south, the actual participants differ significantly from the invited participants in terms of education and age (invited participants are younger and more educated). In the north the actual participants differ significantly from the invited participants as regards their gender composition (the actual participants include more females). Reassuringly, there is no evidence of selection bias in terms of the household's income (precise statistics are available on request).

The experimental sessions started at 8 a.m. and lasted about 3 hours, including payment and the postexperimental demographic survey. Participants were given instructions including a description of the game, examples, and record sheets with a series of questions to be answered for each game. Illiterate subjects (3%) were given oral instructions. Participants who had difficulty completing record sheets by themselves were also helped by assistants. On average, participants earned KVND 120 (about $7), roughly 3–4 days' wage for casual unskilled labor. They were paid in private in a separate room.

D. Pool of Participants

Table 1 gives some descriptive statistics by region. The characteristics in the first panel are those reported by the participants and those in the second panel were elicited during the experiment.

According to Mann-Whitney tests in which each individual is an independent observation, the participants from the north are slightly older and more educated on average than those from the south. Proportion tests indicate that the share of females is higher in the north. The proportions of participants holding an occupation in agriculture and having a secondary job are fairly balanced in the two regions. While participants are more loss averse in the north than in the south, time preferences do not differ significantly across regions.

The probability weighting parameter (α) is significantly smaller than 1, and the loss aversion parameter (λ) is significantly greater than 1 in both regions (t-tests, $p < .001$). This finding rejects the EU function and shows that utility is better described by an inverted S-shaped utility function (they overweight small probabilities and underweight large ones) and by loss aversion. The mean estimated values of α, σ are (0.633, 0.553) for the north and (0.645, 0.569) for the south.[14] These values are close to those estimated by Tanaka

[14] Ordinary least squares (OLS) estimates of the curvature of the utility function against individual characteristics show that participants with a higher income are more risk seeking (σ is lower) and that, controlling for absolute income, those who have a higher relative income are more risk averse. In

TABLE 1
DESCRIPTIVE STATISTICS OF PARTICIPANTS BY REGION

	North		South		Total	
	Mean	SD	Mean	SD	Mean	SD
Characteristics reported by the participants:						
Age	53.15	11.77	47.28***	9.94	50	11.30
Female	.57	.50	.32***	.47	.45	.50
Years of education	8.47	4.59	7.15**	3.62	7.8	4.19
First job in agriculture	.70	.46	.62	.49	.66	.47
Holding a second job	.44	.50	.38	.49	.41	.49
Total income	42.37	51.61	34.95	28.17	38.73	41.83
Characteristics elicited in the experiment:						
Probability weighting (α)	.633	.206	.645	.241	.638	.223
Risk aversion (σ)	.553	.275	.569	.274	.561	.274
Loss aversion (λ)	3.542	3.242	2.676**	3.056	3.130	3.175
Time discounting rate (r)	.005	.014	.003	.012	.004	.013
Present bias (β)	.610	.610	.560	.560	.586	.161
Number of participants	87		79		166	

Note. Significance is of either Mann-Whitney rank-sum tests or proportion tests comparing the sample from the north and the sample from the south. The midpoint of the lower and upper bounds of the switching point in questions of series 3 in game 1 is λ, and it takes different values when risk aversion (σ) differs. Here, we used the values of λ corresponding to $\sigma = 1$. The estimated value of λ would gain much the same result using different values of the risk aversion parameter (see Tanaka et al. 2010, 560). The level of significance of the comparison between north and south is not affected when taking other values of σ.
** Significant at the 5% level.
*** Significant at the 1% level.

et al. (2010) for the north (0.74, 0.59) and the south (0.74, 0.63) of Vietnam and to those found by Liu (2013) with the same method for farmers in China (0.69, 0.48). Our estimation of λ is 3.542 in the north and 2.676 in the south (they were 2.63 in Tanaka et al. 2010; 3.47 in Liu 2013).[15]

Regarding time preferences, the mean values of the time discounting rate (r) and of the present bias parameter (β) are 0.005 and 0.610, respectively, in the north and 0.003 and 0.560, respectively, in the south.[16] In Tanaka et al. (2010), the estimates were 0.008 for r and 0.644 for β, showing that our participants are more present biased. In our estimates, β is significantly different

the south only, older participants are more risk averse, but this relationship is not linear. In the north only, higher education is associated with a higher risk aversion. The regression of risk parameters against demographic variables is available on request.

[15] Regression results for loss aversion show that older participants are less loss averse, but the relationship is U-shaped. Richer participants are more loss averse, but a higher relative income reduces loss aversion.

[16] Regression results for discount rate and present bias conclude that females are marginally less patient than males (r is higher), and participants who hold a second job are less present biased (β is higher). In the south, we found that females and older participants are more present biased, but this relationship is nonlinear; richer participants are also more present biased, but having a higher relative income decreases the present bias.

from 1 in both regions ($p < .001$), which tends to reject the exponential-discounting model and supports the quasi-hyperbolic discounting approach.

III. Results

We now turn to analyzing the results from the trust game. We first show summary statistics. Then, we explore the determinants of trust and trustworthiness by means of a regression analysis.

A. Summary Statistics

Table 2 presents summary statistics by region. We first consider the mean amount sent by the trustors. Trustees' trustworthiness is captured by the mean proportion of total wealth returned by the trustees conditional on each amount possibly sent by the trustor. Table 2 also mentions the mean return expected by

TABLE 2
SUMMARY STATISTICS ON DECISIONS, BY REGION

	All	North	South	*p*-Value
Mean amount sent by trustors	9.85 (5.12)	9.43 (4.91)	10.32 (5.33)	.289
% trustors sending 0	1.20	1.15	1.27	
% trustors sending 5	37.35	39.08	35.44	
% trustors sending 10	37.35	41.38	32.91	.539*
% trustors sending 15	11.45	6.90	16.46	
% trustors sending 20	12.65	11.49	13.92	
Mean expected return	16.69 (10.99)	14.05 (8.63)	19.61 (12.52)	.004
Mean amount sent by trustees:				
If trustor sends 5	10.77 (5.61)	9.72 (5.01)	11.93 (6.03)	.012
If trustor sends 10	16.46 (8.42)	14.06 (5.65)	19.10 (10.06)	.001
If trustor sends 15	20.82 (10.90)	15.79 (6.97)	24.87 (11.81)	<.001
If trustor sends 20	25.54 (12.86)	20.98 (9.46)	30.57 (14.23)	<.001
Mean percentage of total wealth (amount sent × 3 + endowment) sent to trustors:				
If trustor sends 5	30.78 (16.04)	27.78 (14.32)	34.09 (17.23)	.012
If trustor sends 10	32.92 (16.84)	28.11 (11.30)	38.20 (20.13)	.001
If trustor sends 15	32.02 (16.77)	24.30 (10.72)	38.26 (18.18)	.001
If trustor sends 20	31.97 (16.08)	26.22 (11.82)	38.21 (17.79)	<.001
Mean %	31.81 (12.97)	26.91 (8.89)	37.20 (14.58)	<.001
Percentage of trustees sending more than amount received × 3:				
If trustor sends 5	8.43	4.60	12.66	.063
If trustor sends 10	3.61	0	7.59	.009
If trustor sends 15	2.13	0	3.85	.117
If trustor sends 20	.60	0	1.26	.294

Note. Samples include 87 observations for the north and 79 for the south. However, due to mistakes in recording data, 25 observations are missing for the return of trustees in case the trustor has sent 15 (one village with 24 observations in the north and one observation in the south). Amounts are expressed in KVND. *p*-values are from two sample Mann-Whitney rank sum tests comparing the north and south samples. Standard deviations are in parentheses.

* Corresponds to a two-sample Kolmogorov-Smirnov test for equality of distributions for all possible amounts sent.

the trustors and the percentage of trustees who return more than the tripled amount sent by the trustor. Figure 1 displays the expectations of the trustors depending on the amount they send to the trustee, by region (excluding the two participants who sent nothing).

Table 2 shows that the mean amount sent by the trustors is KVND 9.85, which represents 49.25% of the initial endowment. Trustors transfer 47.15% of their endowment in the north and 51.60% in the south, but the difference is not statistically significant. A Kolmogorov-Smirnov test concludes that the distribution of transfers does not differ across regions. Overall, the senders' behavior in both regions is comparable with other studies.[17]

The amount sent is motivated in part by the expectation of reciprocity. Figure 1 shows that higher transfers are associated with higher expectations of return in absolute terms. Interestingly, trustors in the north expect on average lower returns from their counterpart (14.05) than trustors in the south (19.61, $p = .004$), except those who send all their endowment. This indicates that individuals behave similarly in the north and in the south, although the former are less confident on the return of their transfer.

Regarding trustees' behavior, the Nash equilibrium of a null return is almost never played (one observation when the transfer is 5 or 10 and three observations when it is 15). Trustees return on average 31.81% of their wealth to the trustor (SD = 12.97).[18] The mean percentage returned is significantly higher in the south (37.20, SD = 14.58) than in the north (26.91, SD = 8.89; $p < .001$), for any amount sent by the trustor. The standard deviation of the percentage returned for each amount sent is smaller in the north than in the south. This is consistent with the idea that market integration—that started earlier in the south—tends to foster norms that lead to more reciproc-

[17] In a meta-analysis of the trust game, Johnson and Mislin (2011a, 2011b) show that, on average, trustors send 50.88% of their endowment, although variations across studies are large. This proportion is 51.60% in Berg et al. (1995) and 49.50% in the American-subjects sample in the impersonal communication treatment of Buchan et al. (2006). We are aware that higher stakes tend to reduce trust. In our case, KVND 20 represent between half a day's and a full day's wage. For a stake of a full day's wage in Russia, Bahry and Wilson (2004) found that 62% of the subjects send at least 50% of their endowment. We found 61.45% in our sample. Studying trust with a public goods game, Carpenter et al. (2004) found that Vietnamese were more trusting than Thais, but the result may be driven by the possibility to sanction deviations from the norm. Comparing American students and recent immigrants from Vietnam, Parks and Vu (1994) found that Vietnamese were more cooperative in public goods games.

[18] Surveying 75 studies, Johnson and Mislin (2011a) find a mean rate of return of 36.51% of the tripled amount received, which simply compensates—on average—trustors. In Buchan et al. (2006), the mean rate of return was is 37% and 11% of the trustees returned nothing.

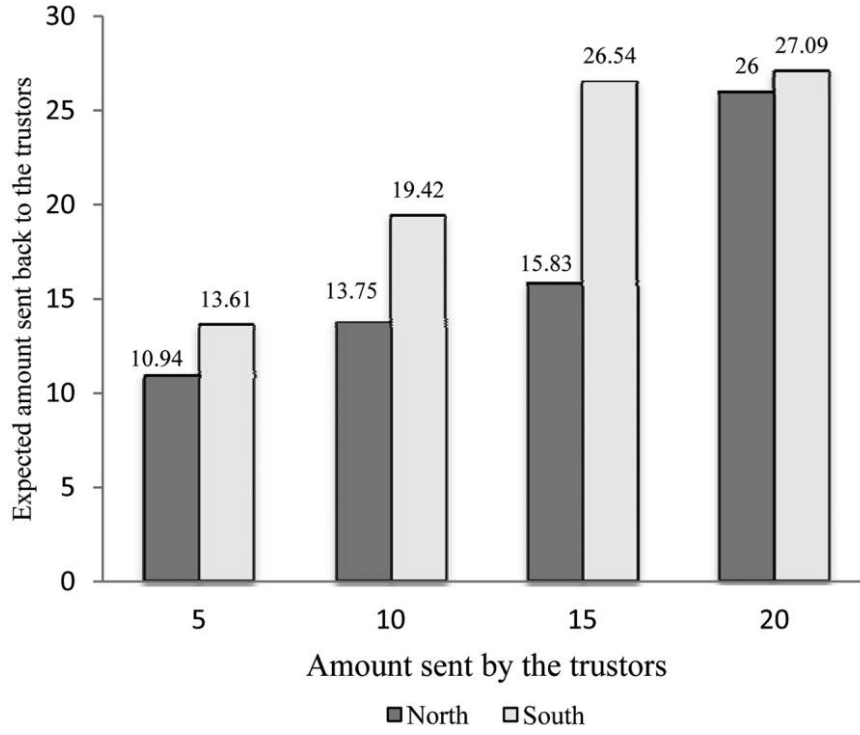

Figure 1. Trustors' expectations regarding the amount sent back by the trustees, by region and amount sent.

ity. However, simple comparisons should be taken with care since the two samples present differences in terms of participants' characteristics.

The absolute amount returned to the trustor increases in the amount potentially received, confirming that trustees are willing to return the trust expressed by the trustors. However, the amount returned represents a stable percentage of the total wealth as the amount received from the trustor increases. The only significant difference is when the trustor sends 10 compared to 5 (Wilcoxon test, $p = .003$). Most people do not try to equalize payoffs, which would require that the trustee sends back two-thirds of the tripled amount received (i.e., an increasing proportion of total wealth). Many players reciprocate, but they also exploit to some extent the trustors. Table 2 also indicates that a small fraction of the trustees send more than the amount received when transfers are low, increasing inequality at the benefit of the other player. This suggests that a low transfer is not necessarily interpreted as a lack of trust and that some trustees express unconditional other-regarding preferences, consistent with Cox (2004) and Ashraf et al. (2006). To investigate further the determinants of behavior, we proceed now to an econometric analysis.

B. *Econometric Analysis*

Our empirical exercise is based on the following model specification:

$$Y = f(\theta, X) + \varepsilon,$$

where Y represents trust or trustworthiness, θ is the vector of risk and time preferences parameter, X is a vector of demographic variables, and ε is the standard error term.

Trustor's Behavior

Table 3 reports the results of regressions in which the dependent variable is the amount sent by the trustors. Since this variable takes categorical values (0, 5, 10, 15, or 20), we estimate ordered probit models on the whole sample (models 1 and 2), the north subsample (model 3) and the south subsample (model 4). Except in model 1, we include village fixed effects in the estimations to control for possible different levels of development. The independent variables include the expectation of the individual regarding the amount returned by the trustee since we expect that the amount sent is partly motivated by the expectation of reciprocity. The models also account for the estimated parameters for risk attitudes (probability weighting, α; risk aversion, σ; and loss aversion, λ) and for time preferences (time discounting rate, r; and present bias, β).[19] We control for the number of acquaintances in the session since individuals may be more trustful with their anonymous counterpart if it is more likely that they know him personally (see the importance of the target in trust games in McEvily et al. [2012] or of social distance in Song, Cadsby, and Bi [2012]). We control for demographic variables (age and age^2, gender, and years of education), the occupational status (first job being in agriculture, holding a second job), and both absolute and relative income.[20] Table A4 in

[19] The midpoint of the lower bound and upper bound of the switching point in questions of series 3 in game 1 is λ, and it takes different values when risk aversion (σ) differs. In all the regression analysis reported in this article, we use the values of λ corresponding to $\sigma = 1$. Tanaka et al. (2010) show that the choice of σ would have no effect on the estimation of λ. That said, we also estimated all our models with a value of λ given by $\sigma = 0.2$ and by $\sigma = 0.6$ (not reported here but available on request). The results are not affected.

[20] Financial data come from the VHLSS 2002. Total income has been reconstituted by adding all the sources of income of the households as detailed in the survey. Since the experiment was already more than 3 hours long, it would have been difficult to collect truthful additional information on the various financial resources at the end of the sessions. Relative income measures the household's relative status in the village. It is calculated as the ratio of each household's income to the mean income of the participants from the same village. Total income may be endogenous, as it may influence trust, but it may also be determined by the ability to trust others. For that reason, we have reestimated these models using rainfall at the time and location of the 2002 survey as an exogenous instrument for income. Indeed, weather is likely to influence income, as most participants hold jobs

TABLE 3

DETERMINANTS OF THE AMOUNT SENT BY THE TRUSTOR

	All		North	South
	(1)	(2)	(3)	(4)
Expectation of return from player 2	.052*** (.011)	.052*** (0.011)	.082*** (0.016)	.037*** (.13)
South (=1)	−.24 (.218)			
Probability weighting (α)	−.69 (.444)	−.69 (.465)	−1.273* (.776)	.593 (.71)
Risk aversion (σ)	−.345 (.376)	−.355 (.382)	−.468 (.593)	−.542 (.572)
Loss aversion (λ)	−.44 (.31)	−.35 (.32)	−.75 (.54)	.7 (.47)
Time discounting rate (r)	9.79 (7.314)	9.456 (7.189)	1.762 (12.761)	13.519* (8.165)
Present bias (β)	.137 (.775)	.164 (.765)	−.266 (1.21)	1.127 (1.211)
Number of acquaintances	.1 (.18)	.29 (.23)	.5 (.44)	.41 (.3)
Age	.65^{+} (.41)	.62 (.44)	<.1 (.65)	.92 (.98)
Age^2	−.1* (<.1)	−.1^{+} (<.1)	<−.1 (.1)	−.1 (.1)
Female (=1)	−.65 (.187)	−.43 (.218)	−.321 (.394)	.367 (.381)
Years of education	−.35* (.19)	−.45** (.21)	−.24 (.25)	−.73 (.48)
First job being in agriculture (=1)	−.358^{+} (.226)	−.344^{+} (.249)	.6 (.431)	−.4 (.41)
Having a second job (=1)	.46** (.188)	.557*** (.197)	.482 (.368)	.645** (.284)
Total income (/1,000)	.7 (.5)	.8 (.8)	−.3 (.1)	.33 (.23)
Relative income	−.48 (.221)	−.1 (.351)	.539 (.468)	−.983 (.808)
Village fixed effects	No	Yes	Yes	Yes
Number of observations	156	156	78	78
Wald χ^2	59.98	66.60	74.53	36.06
$p > \chi^2$	.000	.000	.000	.007
Pseudo-R^2	.144	.152	.260	.138
Log pseudo-likelihood	−176.105	−174.4	−72.162	−91.621

Note. Dependent variable = amount sent by the trustor. Ordered probit models. Model 1 includes only 156 observations because of a lack of information regarding income and remittances for 10 participants in the 2002 household survey data. Standard errors are in parentheses.

$^{+}$ Significant at the 12% level.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

appendix 4, available online, complements this analysis by reporting OLS estimates of the determinants of the expected return as the dependent variable, including the same independent variables as in table 3. These beliefs should not be affected by efficiency concerns or altruism; thus, combined with the decision regarding the amount to send, they allow us to better characterize the trust of the senders. Models 1 and 2 consider the whole sample without and with village fixed effects, respectively; model 3, the north subsample; and model 4, the south subsample.[21]

Table 3 indicates that the senders' behavior is highly significantly influenced by the expected return from the trustees: the more people expect to receive in return, the more they trust and the more they send to others. Note that the amount sent may capture not only trust but also altruism.[22] The amount sent above the expected return probably captures some other-regarding preferences. But since we have no independent measure of individuals' degree of altruism, we cannot isolate trust.

We also note that there is no significant difference between the north and the south. However, a test comparing the coefficients associated with the expected return in the two regions indicates that for a given level of expectation, people in the north send significantly more ($p = .046$), although they hold lower expectations compared to people in the south (table A4).

The second important result is that when we pool all the data together (models 1 and 2), neither risk preferences nor time preferences have a significant influence on the amount sent (table 3) or on the expectations of return (table A4), tending to confirm the findings of Eckel and Wilson (2004), Ashraf et al. (2006), Houser et al. (2010), and McEvily et al. (2012). However, if we reestimate model 1 without including the expected return variable (available on request), we find that the loss aversion parameter becomes sig-

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related to agriculture, but it has no reason to correlate with trust. In the first stage, we have estimated the correlation between income and rainfall, which is significant at the 1% level, to calculate a predicted value of income. In the second stage, we have estimated ordered probit models including the predicted value of income among the independent variables. Since the results are qualitatively unchanged, we do not report these regressions.

[21] We also tested an instrumental variables two-stage least-squares model, instrumenting income with rainfall. Results are qualitatively similar to those reported in table A4, and therefore, we do not report them here.

[22] Indeed, trustors can send money because of other social preferences such as joint welfare or altruism and not only because they trust others. In particular, Carter and Castillo (2003), Cox (2004), and Ashraf et al. (2006) have shown that this game also captures other-regarding preferences. By manipulating receiver's endowments, Brülhart and Usunier (2012) have found, however, that trust is the dominant motivation for senders in this game. Eliciting beliefs also shows that expectations about the return play a major role in the sending decision (Chaudhuri and Gangadharan 2007).

nificant at the 10% level ($p = .082$; but significance vanishes when village dummies are included in model 2). The fact that loss aversion is marginally significant when we do not control for expectations but loses significance when we control for them suggests that loss aversion is mainly related to the trust component of the sending decision. This effect is driven by the sample from the north. Indeed, when we omit the expected return variable from model 3, in the north more loss averse subjects are less likely to trust others, which is consistent with the fact that trust involves a risk of loss if the second player betrays ($p = .039$ without village fixed effects, and $p = .092$ with fixed effects). Table 3 also indicates that probability weighting has a borderline significant negative effect on the amount sent in the north (model 3), while a higher discounting rate increases this amount in the south (model 4). This positive effect of long-term impatience in the south is surprising.

A few other individual characteristics matter. Model 1 shows a borderline significant inverted U-shaped relationship between age and the amount sent that is not influenced by differences in expectations related to age (see table A4). This result is consistent with previous findings (Carpenter et al. 2004; Bellemare and Kröger 2007; Sutter and Kocher 2007). But it is fragile, as it vanishes when we include village fixed effects (model 2). More educated participants tend to be less trustful (as in Schechter 2007; McEvily et al. 2012), although higher education is not correlated with lower expectations. Controlling for income, holding a second job greatly increases the amount sent. This result is driven by the south subsample. We do not find any direct effect of the level of income, in contrast with Bellemare and Kröger (2007). We find no effect of gender (similarly to Croson and Buchan 1999; Ashraf et al. 2006; Cox and Deck 2006), although females expect lower returns than males, especially in the north (see table A4), which may suggest that females' decisions are driven more by social preferences than by the expectation of reciprocity. In a survey on 20 studies of the trust game, Croson and Gneezy (2009) find that gender is reported to influence trust in 12 of them.

We summarize our main results on the trustors' behavior as follows:

> ***Result 1***: The amounts sent by the trustors are partly driven by the expectation of return from the trustee. People in the north do not send less than people in the south, although they are more pessimistic in terms of expected returns than people in the south.

> ***Result 2***: Contrary to conjectures 1 and 3, risk aversion and present bias do not influence the amount sent in general. Supporting conjecture 1, loss aversion decreases the amount sent in the north subsample (but only if we omit the expected return), and probability weighting has the same directional effect. Higher time discounting increases trust in the south subsample.

Trustees' Behavior

Table 4 displays the results of OLS estimates in which the dependent variable is the percentage of total wealth (three times the potential amount sent by the trustor plus the endowment) that is sent back by the trustee to the trustor.[23] Since each trustee's decision is observed four times (when the sender sends him 5, 10, 15, and 20),[24] robust standard errors are clustered at the individual level, and we include village fixed effects except in model 1. Like in previous studies, we only consider the cases in which the sender has sent a positive amount. In all regressions, the set of independent variables is the same as in table 3, except that we include a variable indicating the amount potentially sent by the trustor (that takes values 5, 10, 15, or 20), and we exclude the expected return.

While additional regressions (available on request) show that the amount returned to the trustors increases in the level of trust, models 1 and 2 in table 4 show that the proportion returned is independent on the amount received (consistent with Berg et al. [1995] in the absence of social history and with Barr [2003]). This hides, in fact, two opposite behaviors according to the region. Indeed, the amount sent by the trustor has a nonsignificant but negative influence on the proportion of wealth returned in the north (model 3, $p = .112$), while it has a significant positive influence in the south (model 4). We have also checked with separate regressions that, for each given amount sent, the proportion returned is significantly higher in the south than in the north. Holm and Danielson (2005) also found in Tanzania a negative relationship between the amount sent and the amount returned. They attribute this finding to the fact that—given a share of the amount received—a higher proportion of the endowment sent by the trustor makes it more expensive for the trustee to return.

Overall, these findings indicate that people in the south are more reciprocal than in the north, consistent with Tanaka, Camerer, and Nguyen (2013) in which trustors and trustees had to make choices conditional on the income level of the player they were matched with. A closer examination of our data cannot explain this difference by the use of different heuristics in the two regions (e.g., returning a fixed percentage of wealth such as the midpoint of the range). We investigated whether the regional difference could be driven

[23] Since we have only 10 censored observations out of 576, Tobit models are not required. We also estimated an instrumental variables two-stage least-squares model in which rainfall instruments total income. Most results are qualitatively unaffected.

[24] Except for 23 participants who were observed only three times because of a mistake in registering the amount returned in one village when receiving KVND 15. Note that we have reestimated the models reported in table 3 with only 133 participants. The results are unaffected.

TABLE 4

DETERMINANTS OF THE PERCENTAGE OF WEALTH RETURNED TO THE TRUSTOR

	All		North	South
	(1)	(2)	(3)	(4)
Conditional amount sent	.032 (.087)	.036 (.088)	−.179^{+} (.111)	.244* (.133)
South (=1)	8.231*** (1.954)			
Probability weighting (α)	−5.101 (4.178)	−3.510 (4.087)	−3.222 (5.511)	−4.651 (6.626)
Risk aversion (σ)	7.943** (4.040)	8.089** (3.990)	5.711 (3.754)	12.368* (6.953)
Loss aversion (λ)	−.290 (.287)	−.154 (.330)	−.033 (.311)	−.373 (.576)
Time discounting rate (r)	−73.979 (82.392)	−101.653 (78.32)	−64.316 (87.093)	4.811 (112.611)
Present bias (β)	17.087** (7.304)	15.90** (6.847)	3.912 (6.781)	26.969** (12.271)
Number of acquaintances	.056 (.151)	−.136 (.181)	−.112 (.248)	−.118 (.260)
Age	−.033 (.399)	.025 (.394)	−.459 (.394)	−.112 (1.171)
Age^2	<.001 (.004)	<.001 (.004)	.004 (.004)	.003 (.013)
Female (=1)	−6.999*** (1.731)	−4.829*** (1.844)	−8.607*** (2.098)	−2.922 (3.337)
Years of education	−.670*** (.176)	−.534*** (.179)	−.722*** (.091)	−.364 (.579)
First job in agriculture (=1)	−2.266 (2.157)	−3.988* (2.305)	−5.355** (2.505)	−2.067 (3.656)
Having a second job (=1)	.893 (2.045)	.843 (2.276)	3.773 (2.235)	.374 (3.836)
Total income (/1,000)	−.029 (.047)	.004 (.077)	−.045 (.061)	−.025 (.241)
Relative income	2.668 (2.347)	1.001 (3.720)	3.626 (2.851)	.903 (9.110)
Village fixed effects	No	Yes	Yes	Yes
Constant	24.463** (11.749)	27.69** (12.49)	54.464*** (12.497)	25.456 (31.307)
Number of observations	595	595	284	311
F	4.77	4.29	8.90	2.58
Pr > F	.000	.000	.000	.002
R^2	.196	.222	.207	.172

Note. Dependent variable: percentage of wealth returned to the trustor. Ordinary least squares models. Robust standard errors, in parentheses, have been clustered at the individual level.

$^{+}$ Significant at the 12% level.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

by differences in expectations about others' trustworthiness when subjects play the role of a trustor. In additional regressions (available on request), we find that the higher the expectation of return when in the role of a trustor, the more people return when in the role of a trustee, but this relationship is significant only in the north ($p = .007$). This suggests that the difference in returning behavior is driven partly by the fact that in the north, only those who have higher expectations on others' reciprocity return a higher proportion themselves. Further research is needed to explore whether this difference may result from a longer exposure of populations to collectivist organizations in the north—especially for more educated people—and a longer exposure to market economy in the south, which may have developed different norms or a different knowledge of what shared norms of fairness are. Indeed, it has been shown in particular that market integration is associated with increased levels of fairness and generosity (Ensminger and Henrich 2014).[25]

The proportion returned is not affected by loss aversion. Somewhat surprisingly since the return decision does not involve any risk, the three regressions of table 4 indicate that the proportion returned increases significantly (except in the north) in the concavity of the utility function (σ). Eckel and Wilson (2004) have arrived at the same finding. Additional separate regressions by level of trust show that risk aversion significantly increases the proportion returned when the amount sent was either 5 or 10, whereas it has no significant influence for higher levels of trust. A possible interpretation is that although our game setting is anonymous, anxiety about the fact that not reciprocating could be considered unfair (because of breaking a social norm) is more cogent when the decision is more difficult, that is, when the trustor has sent a smaller amount (indeed, the decision is easier for a pro-social trustee to return a high amount to a trustor who behaved trustfully, but it requires more deliberation when the trustor has sent a small amount). This interpretation assumes that the risk aversion parameter captures anxiety in not only the monetary domain but also the social domain.

[25] Uslaner (2008) and Brosig-Koch et al. (2011) suggest that a communist regime affects cooperation negatively. Its effects on trust and redistributive preferences seem durable (see Alesina and Fuchs-Schündeln 2007; Rainer and Siedler 2009, on Germany after reunification); see also Ockenfels and Weimann (1998) on solidarity in Eastern and Western Germany. Voors et al. (2012) show that historical events such as wars have long-term effects on social and individual preferences. Ensminger (2001) finds with dictator games played in Kenya that market experience teaches fairness. Johnson and Mislin (2011a) mention that the greater is market integration, the more people learn signals on how others expect them to behave in social interactions. Competitive markets favor the formation of shared norms. Note, however, that we find no significant effect of subjects' age that could capture the length of exposure to collectivism or to market economy.

While the proportion returned never depends on long-run patience—the r parameter—it increases significantly and greatly with short-run patience (i.e., the β parameter; this effect is driven by the south sample). This finding is expected, considering that more present-biased individuals are more willing to trade off a short-run benefit for long-run costs in general. Conversely, less impulsive people may be more used to forgoing an immediate benefit in exchange for a long-run benefit in their real life.[26]

Finally, models 1–3 show that in the north more educated individuals and females return a lower proportion of their wealth compared to less educated individuals and males. Barr (2003) and Schechter (2007) also found a negative relationship between gender and trustworthiness and suggest that, in rural villages, women are less used to getting access to money on their own and are therefore less willing to give it up. In the north, holding a job in agriculture also has a negative impact on the proportion returned. The number of acquaintances, absolute and relative incomes, and age do not significantly influence the proportion returned. This contrasts with studies conducted in Europe in which older people are more trustworthy than younger ones (Bellemare and Kröger 2007; Sutter and Kocher 2007).

Our main findings regarding the trustees' behavior can be summarized as follows:

> ***Result 3***: The proportion of total wealth returned by the trustees to the trustor tends to decrease with the amount sent by the trustor in the north, while it increases in the south, suggesting that people in the north act less reciprocally.

> ***Result 4***: In contrast to conjecture 2, risk aversion increases the proportion of wealth returned to the trustor, but loss aversion has no effect. Supporting conjecture 4, less present-biased trustees return a higher proportion of their wealth to the trustor; however, time discounting has no influence.

IV. Conclusion

We have investigated the impact of risk attitudes and time preferences on trust and trustworthiness by conducting an artifactual field experiment in the north and in the south of Vietnam. While previous studies have explored the links between risk attitudes and trust in the framework of the EU theory without

[26] To test whether people behave in the experiment as they behave in their real life, we asked the following question in the postexperiment survey: "generally speaking, would you say that people in your village can be trusted or that you can't be too careful?" A binary trust variable was created. However, we did not find any correlation between this variable and patience or between this variable and the proportion returned. Holm and Danielson (2005) also found that in Tanzania answers to survey trust questions did not correlate with behavior in the trust game.

delivering a consensual response, the novel contribution of this article is in adopting a richer perspective permitted by the use of both the prospect theory and nonstandard theories of intertemporal preferences.

Our analysis shows that the amount sent by the trustors is not affected by the concavity of the utility function, loss aversion, or present bias. These results complement those of Eckel and Wilson (2004), Ashraf et al. (2006), Houser et al. (2010), and McEvily et al. (2012). However, we also found that a higher time discounting increases the amount sent in the south, while probability weighting decreases it in the north. This suggests that without contradicting the standard approach, the richer perspective permitted by the prospect theory and the hyperbolic time preferences approach gives a more precise picture of the role of risk attitudes and time preferences on trusting behavior.

While time discounting and loss aversion do not influence trustworthiness, more risk-averse and less present-biased trustees return a higher share of their wealth to the trustor. An interpretation is that in real settings individuals know that not reciprocating others' trust entails a risk of social sanctions. Since the returning decision does not involve any monetary risk, our measure of risk attitudes may possibly also capture some aspects of social risks. Less present-biased individuals (those who are more future oriented) are more trustworthy possibly because in real settings they are more aware that a short-run benefit may be detrimental to long-run interactions.

Finally, our results show evidence of important regional differences in social preferences, with people in the north of Vietnam holding lower expectations about others' reciprocity and behaving less reciprocally than people in the south. These differences in behavior may be related to differences in the history of communism between the two regions and a longer market integration in the south that may have favored norms of fairness. Even many years after political reunification, regional specificities persist. Our findings are very consistent with those studies on Germany, showing that East Germans who have been exposed to communist institutions showed less trust and less solidarity even long after reunification (Ockenfels and Weimann 1998; Rainer and Siedler 2009; Brosig-Koch et al. 2011). Further investigations are needed to explore how long political institutions and norms shape preferences and expectations even after having been replaced by others.

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