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Rational and Biased Trust

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Abstract: This paper investigates whether expectations of trustworthiness and resulting acts of trust accord with an objective model of trustworthiness or are biased. Combining experimental and survey data, I find that Ghanaian workers appropriately take account of the religiousness of trustees, but expect those with more children to be less as opposed to more trustworthy, and females to be less and the associationally active to be more trustworthy when they are neither. Trustors do not account for the negative impact on trustworthiness of various recent negative experiences and the positive impact of involvement in voluntary work, full time work, and indigenousness.

Keywords: trust; trustworthiness; expectations; field experiment; Ghana.

JEL classifications: C93, Field Experiments; D84, Expectations; Z13, Social Norms and Social Capital.

1.   Introduction

In trusting we render ourselves vulnerable. If our trust is well placed, i.e., if the object of our trust is worthy, it reaps positive returns. But if our trust is poorly placed it leads to losses. Whether trust is well or poorly placed depends in large part on the accuracy of the expectations upon which it is based. And how accurate an individual's expectations are depends on the amount and quality of the information they have and on how they process that information. *Ceteris paribus*, any bias in the way in which individuals construct and process their information sets, any ill founded beliefs about whether and how particular elements in their information set predict trustworthiness, will result in greater vulnerability and a higher probability of loss or in missed opportunities for positive return.

Recent experimental studies indicate that expectations of trustworthiness do indeed affect trustors' behaviour (Ashraf *et al.*, 2004; Barr, 2003; Burns, 2004) and some have identified biases. Table 1 provides information on trustees' characteristics that have been found to impact on trustors' behaviour and whether there is evidence of those characteristics also affecting trustworthiness. It shows that Burns (2004), for example, found that in South Africa black school children are trusted less than white and coloured school children even though they are no less trustworthy, while Ferstman and Gneezy (2001, 2002) found that Eastern Jews relative to Ashkenazic Jews are trusted less despite no evidence that they are less trustworthy.

However, the way in which the subjects in these and other experiments receive the information upon which they base their decisions is considerably different to the way in which individuals acquire information about the people with whom they interact in

daily life. The information sets are presented to the subjects just prior to them making their decision rather than being acquired over possibly quite extended periods of time. And they are acquired through the viewing of photos (Burns, 2004; DeBruine, 2002; Eckle and Wilson, 2003; Scharleman *et al.*, 2001), the reading of names, affiliations, and brief descriptions (Bouckaert and Dhaene, 2003; Eckel and Wilson, 2003, Ferstman and Gneezy, 2001, 2002; Haile *et al.*, 2004; Holm, 2000), or very brief face-to-face meetings (Glaeser *et al.*, 2000; Lazzarini *et al.*, 2004) rather than through a variety of means including conversations and opportunities to observe. Further, in the experiments, the information sets are strictly limited to include data on the characteristics to which the hypothesised biases pertain and just enough other data to act as a camouflage.

These protocols ensure a high degree of control as the experimentalists can observe and, so, take account of all the information presented to the subjects. They are ideally suited to providing answers to questions of the form 'When presented with limited information set, X, about a potential trustee, does a trustor condition his or her decision on $x \in X$?' 'And if he or she does so, is it rational, in the sense that x predicts trustworthiness?' However, by limiting the information set and controlling the way in which it is acquired, the experimenters may be promoting the salience of certain characteristics. And this being the case, the approach is not well suited to providing answers to open and potentially more interesting questions such as 'Upon what information do potential trustors condition their decisions?' and 'In so doing, are they being rational or biased?'

Here, I endeavour to address these open questions by involving groups of individuals who have known and interacted with one another for some time in a trust experiment. The groups of individuals are colleagues sampled from 22 Ghanaian manufacturing enterprises. Barr and Serneels (2004) show that within these enterprises greater trustworthiness among colleagues leads to higher earnings and productivity. Given this *real* return on trustworthiness, it is reasonable to assume that colleagues will have made efforts to provide and collect information on characteristics that signal each others' trustworthiness. The objective of this analysis is to establish what these characteristics are and whether they are appropriately taken into account by trustors. I do this by combining experimental and survey data.

The paper has 4 sections. Following this brief introduction, in section 2, I outline my experimental, survey, and analytical methodology. I present the results in section 3 and in section 4 I conclude with a brief review of the results and a reappraisal of the approach.

2.   Methodology

2.1   *Experimental design*

The experiment involved the Investment Game designed by Berg, Dickhaut and McCabe (1995). The game has two players. At the start of the game both players receive an equal initial cash endowment, y.[2] The first player decides how much of her

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[2] The initial cash endowment, y, was set at Cedi 20,000, just less than twice the mean daily earnings for the sampled employees and apprentices. Play was conducted using Cedi 5,000 notes. The exchange rate prevailing at the time of the fieldwork was Cedi 7,649 to the US dollar.

cash, $s < y$, to pass to the second player. The amount she passes is tripled by the experimenter, and then given to the second player. The second player then decides how much to pass back, $r < 3s$, to the first player. So, the first player's final payoff is $y-s+r$ and the second player's final payoff is $y+3s-r$. Under the classical assumptions of selfish money maximization the second player returns nothing and, expecting this, the first player sends nothing.

The experiment involved 424 employees and apprentices randomly drawn from 22 Ghanaian manufacturing enterprises distributed across two cities, the capital, Accra, and the inland city of Kumasi. The total number of employees and apprentices sampled from each enterprise ranged from 8 to 46.

The games were played after work hours in schools near to the employees' places of work. Two classrooms and a corridor were used in every case. The employees were taught the game while sitting at amply spaced desks in one of the classrooms. Then they were called one at a time to interviews with a research assistant sitting at a desk in the corridor. In these interviews they were taught the game once more, were verbally tested on their understanding of the game, and then played. Finally, they were directed to wait in the second classroom until everyone had played and they could receive their payoffs. Both the description of the game presented in the first classroom and the one-to-one interviews were scripted. The scripts were written in English, translated into Twi, a Ghanaian language spoken by all of the employees and apprentices in our sample, piloted and adjusted, and then back translated by an uninformed translator to check that intended meanings had not changed. The scripts were adhered to at all times. If subjects asked questions, the relevant part of the script

was repeated. The researcher and a monitor were posted in the first classroom to prevent the waiting employees talking after learning the game but prior to making their decisions. Both roles and pairs were randomly assigned. The first players (the trustors) were interviewed in random order and then the second players (the trustees) were interviewed, again in random order. Each first player was informed that they were playing with one of their colleagues who were still waiting in the room they had just exited. Second players were simply informed that they were playing with a colleague. None of the players knew the exact identity of their playing partner.

In the analysis that follows, the jth first player's trust is captured by the amount they sent to the second player expressed as a proportion of their initial stake, s_j / y. The ith second players' trustworthiness is captured by the amount they returned to the first player expressed as a proportion of the amount received from that first player, r_i / s_i.

2.2   *Survey*

The survey data was collected from the employees and apprentices who participated in the experiments during one-to-one interviews with Twi-speaking research assistants conducted a day or so prior to the experimental workshops. The interviews followed a structured questionnaire designed to elicit data on a wide range of respondent's characteristics including, wherever feasible given the context, those indicated by the literature. Table 2 contains a list of the variables that have been found to be significant determinants of trust in previous studies. Topics covered in the Ghanaian interviews included earnings from various activities, employment, ethnicity, religion, civil social activity, recent social experiences, family background, and childhood experiences.

2.3 Analytical approach

The analytical approach is based on the notion of backward induction. First, I identify the determinants of trustworthiness. Then, I establish whether the trustors' behaviour is appropriately conditioned on the incidence of these determinants among their potential trustees or inappropriately conditioned on these and other characteristics.

To find out which of the trustees' personal characteristics determine, predict, or signal their trustworthiness I estimate a trustworthiness function of the form

$$r_i / s_i = R(X_{1i}) + \varepsilon_{1i} \tag{1}$$

where X_{1i} is the vector of personal characteristics that signal trustworthiness and ε_{1i} is assumed to be an i.i.d. normal error term. Linearity is assumed during estimation.

Then, I turn to the analysis of trusting behaviour. I assume that a trustor's willingness to trust depends on a sub-set of their own characteristics and their expectations of their potential trustees' trustworthiness. So,

$$s_j / y = T(Z_j, Exp_j[r_i / s_i]) + \varepsilon_{1j} \tag{2}$$

where Z_j is the vector of own personal characteristics that affect trustors' willingness to trust, $Exp_j[r_i / s_i]$ is the jth trustor's expectation, including biases, and ε_{1j} is an error term.

If trustor's expectations are unbiased,

$$Exp_j[r_i / s_i] = (Exp[r_i / s_i])_j + \varepsilon_{2j} \tag{3a}$$

$$= (Exp[R(X_{1i})])_j + \varepsilon_{2j} \tag{3b}$$

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where the subscript j on $(Exp[r_i / s_i])_j$ and $(Exp[R(X_{1i})])_j$ serves to remind us that each trustor has a distinct set of potential trustees, and ε_{2i} is an error term. If their expectations are biased,

$$Exp_j(r_i / s_i) = (Exp[B(X_{2i}, C_{ij})])_j + \varepsilon_{3i} \tag{3c}$$

where the expectation formation process is assumed to be common to all trustors, X_{2i} is the vector of trustees' characteristics upon which the trustors condition their decisions, C_{ij} is a vector of variables capturing coincidences in identity between the trustors and their potential trustees, and ε_{3i} is an error term. X_{2i} may or may not equal X_{1i}. C_{ij}, the significance of which will indicate biases in favour of or against insiders relative to outsiders, may or may not be empty. And, if $X_{2i} = X_{1i}$ and C_{ij} is empty, bias is implied by $B(.) \neq R(.)$.

Substituting for $Exp_j[r_i / s_i]$ in equation 2 using equations 3a, 3b and 3c generates 3 trust functions each of which can be estimated by combining the experimental and survey data. The ideal proxy for $(Exp[r_i / s_i])_j$ is the average r_i / s_i for each trustors' set of potential trustees. However, we do not have values for r_i / s_i for all potential trustees: all but the last trustor to play in each session would have numbered among their potential trustees some colleagues who were first rather than second players in the game. To combat this problem, while bearing in mind that the order in which the colleagues played was random, I estimate the function

$$s_j / y = T(Z_j, (Exp[r_i / s_i])_j) + \varepsilon_{4j} \tag{4}$$

while weighting each observation according to the proportion of the trustors' potential trustees that actually took the role of trustee in the game and assuming that the error

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term ε_{4j} is i.i.d. normal under this regime. Linearity is assumed during estimation. Here, a positive and significant estimated coefficient on $(Exp[r_i / s_i])_j$ suggests that, to some extent, trustors are effectively predicting trustworthiness within the context of the game and conditioning their behaviour accordingly.

The ideal proxy for $(Exp[R(X_{1i})])_j$ is the average predicted trustworthiness of each trustors' set of potential trustees, where the predictions are derived using the estimation of equation 1. A prediction can be made for all potential trustees. Then the average predicted trustworthiness relating to each trustor's set of potential trustees can be calculated and these averages can be used to estimate the function

$$s_j / y = T(Z_j, (Exp[R(X_{1i})])_j) + \varepsilon_{5j} \tag{5}$$

where the error term ε_{5j} is assumed to be i.i.d. normal. Linearity is assumed during estimation. Here, a positive and significant coefficient on $(Exp[R(X_{1i})])_j$ suggests that the trustors' model of trustworthiness is similar to the estimation of equation 1 and that they are conditioning their behaviour accordingly.

If equation 3c is substituted back into equation 2 and linearity is assumed, we arrive at a function of the form

$$s_j / y = F(Z_j, \overline{X}_{2ij}, \overline{C}_{ij}) + \varepsilon_{6j} \tag{6}$$

where the vector $\overline{X}_{2ij}$ contains the means of the elements in X_{2i} for the jth trustors' set of potential trustees, the vector $\overline{C}_{ij}$ contains the means of the elements in C_{ij}, and ε_{6j} is assumed to be i.i.d. normal. Again assuming linearity, if $\overline{X}_{2ij}$ and X_{1i} contain corresponding elements, a comparison of the coefficients on those elements in

equations 1 and 6 will serve as a first indication of the nature of any biases relating to the corresponding trustees' characteristics. Biases will also be indicated by the sign and significance of any non-corresponding elements in these vectors: some elements in X_{1i} may not be matched by a corresponding element in $\overline{X}_{2ij}$ and vice-versa. And significant coefficients on any elements in $\overline{C}_{ij}$ will indicate insider-outsider biases.

Especially if $(Exp[R(X_{1i})])_j$ is significant in the estimation of equation 5, reintroducing it into equation 6 to give

$$s_j / y = F(Z_j, \overline{X}_{2ij}, \overline{C}_{ij}) + (Exp[R(X_{1i})])_j + \varepsilon_{7j} \tag{7}$$

where ε_{7j} is assumed to be i.i.d. normal, may render the coefficients on the elements of $\overline{X}_{2ij}$ and $\overline{C}_{ij}$ more informative about the nature of the biases. However, multicollinearity could severely constrain the usefulness of this approach.

Determinants of trustworthiness that are neither observable to the trustors nor captured by the survey, pose a potential problem. If they are correlated with variables that are captured, the coefficients on the latter will be subject to omitted variable bias. However, the biases will be similar throughout the analysis. The same problem applies if there are determinants of trustworthiness that *are* appropriately taken into account by the trustors, are not captured during the survey, and are correlated with characteristics that do enter into the analysis. If there are trustees' characteristics that are not determinants of trustworthiness, are not captured by the survey, but do affect trustors' decisions and are correlated with variables that are captured, these will bias the coefficients on the latter in equations 6 and 7. As a result, caution must be applied

when drawing conclusions about the precise nature of the characteristics that act as catalysts for bias in trusting behaviour.

3.   Results

3.1   Descriptive statistics

A histogram of amounts sent by the 212 first players is presented in Figure 1. Only 15 percent of the first players sent nothing. Nearly 40 percent of the players sent half of their original stake and over ten percent sent the entire stake.

The distribution of proportions returned by the 180 second players who received some positive amount from their playing partner is presented in Figure 2. In this case, less than two percent of the players behaved in a manner consistent with the classical assumptions by returning nothing. Over 35 percent returned double the amount sent, thereby ensuring equal final payoffs for themselves and their playing partners. Just under 30 percent returned the amount sent leaving their playing partner with a final payoff equal to their initial stake, while keeping the full return on the trusting act for themselves. Most of the remainder (just under 25 percent) returned an amount in between these two modes, thereby providing their playing partners with a positive return on their trusting acts, while securing a higher final payoff for themselves.

Table 3 contains definitions, sample means, proportions, and, in the case of continuous variables, standard deviations for various characteristics of the first players in the experiment and the 180 second players who received a positive amount

from their playing partner.[3] 22 percent of the players are female. Their mean age is just under 30 years and, on average, they have 10 years of formal education. 36 percent are married and the average player has 1.15 children. Their mean total monthly earnings from all sources are Cedi 286,000 (just over US$37) per month. The large majority of these earnings derive from their work in the manufacturing enterprises from which they were sampled for this study. On average, the players have been working in these enterprises for over 5 years with only 12 percent holding part time positions. Nearly 10 percent have experienced a period of unemployment within the last 5 years and nearly 40 percent took time off work due to ill health during the preceding 12 months.

Reflecting the regional focus of the study, the Asante and Fante, both Akan groups, dominate the sample (36 and 22 percent respectively) with other Akan groups accounting for a large proportion of the remainder (14 percent). These groups are particularly dominant in Kumasi, the capital of the Asante kingdom, from whence 50 percent of the sample is drawn. The Ga and Adangbe, who are specifically indigenous to the Accra area, account for only 14 percent of the sample reflecting the tendency for members of these groups to focus on activities other than manufacturing. The Ewe, from the Volta region, account for around 10 percent of the sample. And migrants from the north account for less than 5 percent of the sample. Nearly 50 percent of the players are indigenous to the area in which they live and work.

37 percent of the players are Protestant, 11.5 percent are Catholic, 43 percent belong to other Christian denominations, mainly new charismatic churches specific to Ghana,

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[3] Eight questionnaires relating to first players were lost prior to data entry.

and 5.5 percent are Muslim. Levels of religious activity are high: the average frequency of engagement in an act of worship being nearly 15 times per month. This figure is strongly influenced by the few Muslims in the sample, who pray several times a day. However, many of the Christians attend church 3 or more times a week. Involvement in civil social activities is also considerable: the average player reported 3 hours of formal associational activity and 1 additional hour of voluntary work per month. Finally, the average player recalls being let down by a friend 0.5 times during the last 12 months.[4]

Table 3 also presents the means and standard deviations for $(Exp[r_i / s_i])_j$ and $(Exp[R(X_{1i})])_j$ across the 204 trustors. According to the former, the expected return to an average trustor, based on the actual behaviour of the trustees from their place of work, is 1.482 times the amount they sent. According to the latter, the expected return to an average trustor, based on the predicted (using the model in column 2 of Table 2) behaviour of all their potential trustees is 1.496 times the amount they sent.

Table 3 contains the means across all trustors of 15 means and proportions relating to their unique sets of potential trustees. As expected, these closely reflect the

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[4] The following additional variables were incorporated into early runs of the analysis but never significantly improved the fit of the estimated models: the players' number of siblings, where they fell among their siblings in terms of birth order, their mothers' and fathers' education, whether they lived with people other than their parents of a significant part of their childhood, whether they recall being let down as a child, whether they recalled being happy as a child, whether any of their relatives died in the preceding 12 months, whether they are related to or from the same ethnic group as their employer, how many of their colleagues are relatives or from the same ethnic group, whether they are a recent migrant into the city, whether they were rural or urban born, whether they feel safe where they sleep at night, whether they sleep in their place of work, whether they think the neighbourhood in which they live is safe, whether they are a household head, with how many people they habitually share their meals, the number of times per week they go to a market to buy, the number of times per week they go to a market to sell, their ownership of an assortment of durable items, whether they belong to a labour union, their occupation, and the number of jobs they hold.

corresponding means and proportions described above. However, note that there is considerable variation across trustors. And finally, Table 3 presents the means across all trustors of three variables capturing coincidences in identity between themselves and their potential trustees. 48 percent of the average trustor's potential trustees are from the trustor's own ethnic group. 38 percent are from the trustor's own religion, and 82 percent are of the same sex. Again, there is considerable variation in these proportions across trustors.

3.2 Regression analyses

Table 4 contains the analysis of trustworthiness. Two estimations of equation 1 are presented each taking r_i / s_i as the dependent variable. Both are estimated using ordinary least squares (OLS) with errors corrected for any heteroscedasiticity relating to the right-hand side variables and workplace. The regression in the first column contains 16 explanatory variables, although only nine have significant coefficients. The second regression includes eight out of these nine explanatory variables; the marital status of the player looses significance as variables are dropped from the model. The number of children a trustee has was not significant in the general model but became strongly significant once the age and married variables were removed. Dummy variables identifying the enterprises from which the players came, the city in which they are located, their religion, or their ethnicity did not significantly add to the performance of the model. According to the preferred parsimonious model players with more children, who are indigenous to the place in which they are living and working, who more frequently attend acts of worship, and/or who spend more of their time engaging in voluntary work are more trustworthy in the sense that they return a larger proportion of the amount entrusted to them within the context of the game.

Part-time employees, those who have experienced a period of unemployment during the past 5 years, those who have had to take time off work due to ill health during the past year, and/or those who have been let down by friends more often during the past year are less trustworthy in the sense that they return a smaller proportion of the amount entrusted to them within the context of the game. Finally, *ceteris paribus*, apparent trustworthiness declines as the number of subjects in the session and hence their sense of anonymity increases.

Table 5 presents the initial stages of the analysis of trust. The regressions take s_j / y as the dependent variable. The regressions in the first and second columns take only the trustors' characteristics as explanatory variables and are estimated using OLS with errors corrected for heteroscedasticity as before. The first contains 16 explanatory variables, although only four have significant coefficients. The second includes only those four explanatory variables. Dummy variables identifying the enterprises from which the players came, the city in which they were located, their religion, or their ethnicity did not significantly add to the performance of the model. According to the more parsimonious model (second column) more educated and higher earning players are more trusting in the sense that they send a greater proportion of their original endowment to second players within the context of the game, while female players and those who spend more time engaged in voluntary work are less trusting.

The third and fourth columns of Table 5 contain estimations of equations 4 and 5 respectively. The regression in the third column includes the 4 significant trustors' characteristics and the proxy for $(Exp[r_i / s_i])_j$, the mean actual trustworthiness of each trustor's colleagues who played as trustees. This equation is estimated using

weighted least squares (WLS), where the weights for each observation relate to the proportion of the trustor's potential trustees that actually revealed their trustworthiness by assuming the role of trustee in the game, and errors are corrected for heteroscedasticity as before. The coefficient on $(Exp[r_i / s_i])_j$ is positive but insignificant. The regression in the fourth column includes the four significant trustors' characteristics and the proxy for $(Exp[R(X_{1i})])_j$, the mean predicted trustworthiness of the trustors' potential trustees derived using the regression presented in the second column of Table 4, and is estimated using OLS with errors corrected for heteroscedasticity as before. The coefficient on mean $(Exp[R(X_{1i})])_j$ is positive but insignificant, suggesting that the trustors' model of trustworthiness differs from the one presented in the second column of Table 4.

Table 6 presents two estimations of equation 6 and one estimation of equation 7. In every case, s_j / y is the dependent variable and the estimations are OLS with errors corrected for heteroscedasticity as before. To facilitate comparison, the parsimonious model of trust containing only trustors' characteristics is also presented in the first column (repeated from the second column of Table 4). In the second column 18 means and proportions relating to the trustees are included. The first eight of these relate to characteristics that were found to be predictors of trustworthiness. The next seven were found not to predict trustworthiness. And the final three capture coincidences in the identity of the trustors and their trustees. Three out of the first set of means and proportions, two out of the second set, and none of the coincidence in identity variables are significant. If the insignificant means and proportions and coincidence variables are excluded, along with mean involvement in voluntary work

which becomes insignificant when other variables are dropped, we arrive at the model presented in the third column. Here, in accordance with the estimated model of trustworthiness, as the potential trustees' frequency of religious attendance increases, trust increases. However, that trust declines as the potential trustees' average number of children increases does not accord with the estimated model of trustworthiness. Also not in accordance with the estimated model of trustworthiness, as the proportion of women among the potential trustees increases, trust declines and as the potential trustees' average involvement in associational activity increases, trust increases. Finally, note that the inclusion of these four means and proportions relating to the potential trustees renders the coefficients on the trustors' sex and involvement in voluntary work insignificant.

The fourth column of Table 6 contains the estimation of equation 7. The mean predicted trustworthiness of the potential trustees bears a significant coefficient with the wrong sign. This is likely to be a symptom of multicolinearity: mean predicted trustworthiness is highly correlated with each of the means and proportions relating to the trustees. Its inclusion leaves all other findings unchanged.

4.   Conclusions

The objective of the analysis presented above was to establish which trustees' characteristics trustors take into account when deciding whether and how much to trust and whether these characteristics are genuine signals of trustworthiness. Using experimental and survey data relating to Ghanaian manufacturing workers and

apprentices I conducted an analysis which took account of the possible effects of a wide range of trustees' characteristics. Thus, I discovered that male trustees, trustees with fewer children, and trustees who are more religiously and associationally active are trusted more. However, only one of these characteristics was found to have a corresponding effect on trustworthiness: trustees who are more religiously active are more trustworthy. Trustees with fewer children are more rather than less trusting and neither sex nor associational activity is associated with trustworthiness. The incorrect interpretation of information on trustees' number of children by trustors may indicate that they are wary of trustees with competing obligations: will they keep the money for themselves and their family or provide a return on the trusting act? That females are trusted less might be interpreted in the same way. That associational activity is inappropriately taken as a sign of trustworthiness suggests that trustors have misplaced faith in social capital theory.

Indicators of trustworthiness that trustors do not appear to take into account include their trustees' recent experiences of illness, unemployment and being let down by friends. It may be that trustors do not have access to this sort of information: that such experiences impact negatively on trustworthiness would provide trustors with an incentive to find out about them, but would, at the same time, provide potential trustees with an incentive to keep them secret. Alternatively, trustors may know about these experiences and choose to discount them, seeing the placing of trust in the victims of such events as an opportunity to rebuild confidence in human nature.

That trustors are unaware of or discount the fact that trustees who are indigenous to the area in which they live and work, involved in voluntary work, and full as opposed

to part time in the context in which they interact with the trustor, are more trustworthy is harder to explain.

That no evidence of insider bias was found during the analysis suggests that within the context of study there is a fair degree of tolerance between individuals of different ethnicity, religion, and sex.

Of course, these results may be subject to omitted variable bias and should be treated with some caution. This, along with the problems of multicolinearity described in section 4 above, are the primary shortcomings of this analytical approach. They derive from the reduction in experimenter control associated with shifting the focus of analysis from experimentally constructed and restricted information sets to naturally constructed and potentially unbounded information sets. The potential impact of these shortcomings on the conclusions we can draw from this analysis is difficult to quantify and, this being the case, it may be appropriate to view this approach as a complement to rather than a substitute for the more controlled approach taken in earlier studies. The best next step in the analysis of biases in trust might be to treat the findings of this investigation as hypotheses in a laboratory experiment involving experimentally constructed information sets that include data on some of the trustee characteristics that have been identified as important above.

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Figures and tables

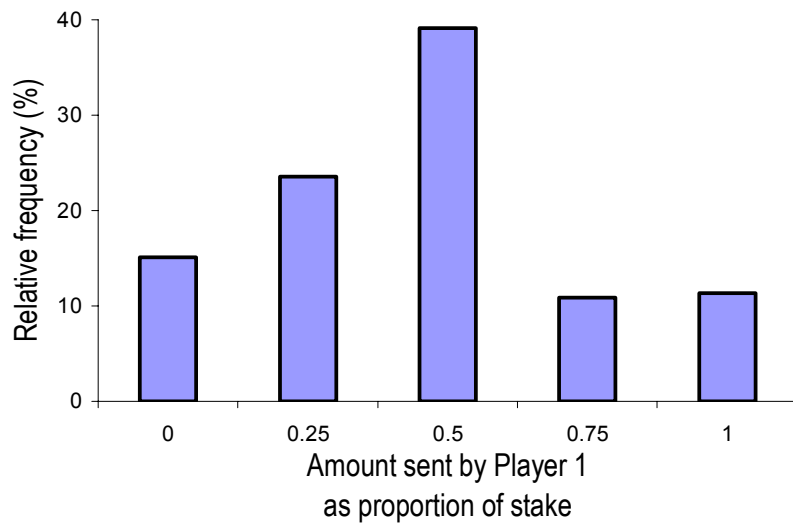## Figure 1: First players' behaviour

Figure 2: Second players' behaviour
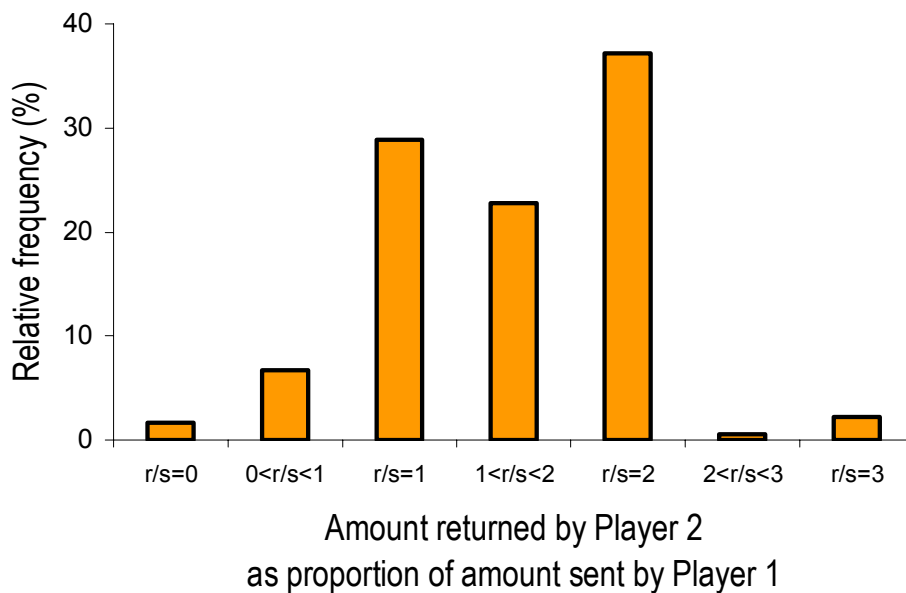
Table 1: Impact of trustees' characteristics on trustors' behaviour (a literature review)

Characteristic of trustee	Effect on trust		Citation	Behavioural measure	How info. conveyed	Subjects
Sex	women more	✓	Holm and Nystedt (2002)*	e n		Swedish citizens
	women more	?	Bohnet and Zeckhauser (2003)*	e n		Students, US
Age	-	?	Bohnet and Zeckhauser (2003)*	e n		Students, US
Income	+	?	Bohnet and Zeckhauser (2003)*	e n		Students, US
Religion	same as trustor more	?	Ferstman and Gneezy (2002)	e	tw	Students, Belgium and Israel
	religious more	?	Bohnet and Zeckhauser (2003)*	e n		Students, US
Race/ethnicity	black less	✗	Burns (2004)	e	ph	School children, South Africa
	minorities less	✓	Eckel and Wilson (2003)	e	ph or tw	Students, US
	immigrants less	?	Bohnet and Zeckhauser (2003)*	e n		Students, US
	Eastern Jews less	✗	Ferstman and Gneezy (2001)	e	tw	Students, Israel
	different from trustor less	✗	Ferstman and Gneezy (2002)	e	tw	Students, Belgium and Israel
	different from trustor less	✓	Haile et al. (2004)	e	tw	Students, South Africa
Social distance	-	✓	Crosen and Buchan (1999)	e	tw	Students, China, Korea, Tokyo, US
Phenotypic similarity	similar more	?	DeBruine (2002)	e	ph	Students, US
Smiling	+	?	Scharleman et al. (2001)	e	ph	Students, UK

e   Behavioural measure experimental

n   Behavioural measure non-experimental

✓ Trustees' characteristic found to affect trustworthiness in same way

✗ Trustees' characteristic found not to affect trustworthiness in same way

? No information on whether and how trustees' characteristic affects trustworthiness

* In these studies the trustors were required to identify the type of playing partner they would prefer/trust.

ph Troustors presented with photos of trustees

wt Trustors written or told trustee's name and/or characteristic

Table 2: Determinants of trust and trustworthiness
(a literature review)

Determinant	Effect	Citation	Behavioural measure	Subjects
Trustors' characteristics affecting trust				
Sex	men more	Chaundury and Gangadharan (2003)	e	Students, Australia
	men less	Eckel and Wilson (2003)	e	Students, US
Age	-	Fehr et al. (2003)	e	German citizens
	inverse U	Bellmare and Kroger (2003)	e n	Dutch citizens
Education	+	Alesina and La Ferrara (2002)	n	US citizens
	+	Helliwell and Putnam (1999)	n	US citizens
	inverse U	Bellmare and Kroger (2003)	e n	Dutch citizens
Skills	-	Fehr et al. (2003)	e	German citizens
Household size	-	Fehr et al. (2003)	e	German citizens
Income	+	Alesina and La Ferrara (2002)	n	US citizens
Income inequality	-	Alesina and La Ferrara (2002)	n	US citizens
Religion	Catholics more	Fehr et al. (2003)	e	German citizens
	hierarchical religions less	La Porta et al. (1997)	n	Countries
Political affiliation	socialists more	Fehr et al. (2003)	e	German citizens
Race/ethnicity	black less	Ashraf et al. (2004)	e n	Students, Russia, South Africa, US
	black less	Burns (2004)	e	School children, South Africa
	minorities less	Alesina and La Ferrara (2002)	n	US citizens
	immigrants more	Fehr et al. (2003)	e	German citizens
Racial diversity	-	Alesina and La Ferrara (2002)	n	US citizens
	+	Burns (2004)	e	School children, South Africa
Recent traumas	-	Alesina and La Ferrara (2002)	n	US citizens
Experience of generosity	+	Glaeser et al.	e	Students, US
Expectations	+	Ashraf et al. (2004)	e n	Students, Russia, South Africa, US
	+	Barr (2003)	e	Villagers in Zimbabwe
	+	Burns (2004)	e	School children, South Africa
Trustees' characteristics affecting trustworthiness				
Sex	women more	Bellmare and Kroger (2003)	e n	Dutch citizens
	women more	Chaundury and Gangadharan (2003)	e	Students, Australia
	women more	Crosen and Buchan (1999)	e	Students, China, Korea, Tokyo, US
Age	-	Bellmare and Kroger (2003)	e n	Dutch citizens
	freshman rel to others less	Glaeser et al.	e	Students, US
	+	Fehr et al. (2003)	e	German citizens
Education	-	Bellmare and Kroger (2003)	e n	Dutch citizens
Health	+	Fehr et al. (2003)	e	German citizens
Employment	+	Fehr et al. (2003)	e	German citizens
Only children	-	Glaeser et al.	e	Students, US
Political affiliation	no affiliation less	Fehr et al. (2003)	e	German citizens
Race/ethnicity	coloured less	Burns (2004)	e	School children, South Africa
	non-white	Glaeser et al.	e	Students, US
	minorities less	Eckel and Wilson (2003)	e	Students, US
Racial diversity	+	Burns (2004)	e	School children, South Africa
Attractiveness	-	Eckel and Wilson (2003)	e	Students, US

e Behavioural measure experimental

n Behavioural measure non-experimental

Table 3: Players' characteristics

Characteristic	All Players Mean/Prop.	Std. Dev.	First players Mean/Prop.	Std. Dev.	Second players Mean/Prop.	Std. Dev.
female (dummy variable)	0.224		0.230		0.217	
age (in years)	29.448	10.262	29.681	10.671	29.183	9.800
education (in years)	9.997	3.102	9.946	3.095	10.056	3.117
married (dummy variable)	0.362		0.358		0.367	
children (number of)	1.148	1.766	1.147	1.701	1.150	1.841
total income	286.318	264.059	287.554	272.928	284.918	254.385
ln(total income)	5.362	0.782	5.359	0.781	5.365	0.785
years in workplace	5.349	5.943	5.796	6.680	4.842	4.950
part time (dummy variable)	0.120		0.127		0.111	
unemployed (in last 5 years, dummy variable)	0.094		0.078		0.111	
illness (time off in past year, dummy variable)	0.388		0.397		0.378	
Ethnicity						
Asante (dummy variable)	0.367		0.402		0.328	
Fante (dummy variable)	0.219		0.221		0.217	
Other Akan (dummy variable)	0.138		0.123		0.156	
Ga-Adangbe (dummy variable)	0.143		0.142		0.144	
Ewe (dummy variable)	0.091		0.093		0.089	
Northern (dummy variable)	0.042		0.020		0.067	
Indigneous to area (dummy variable)	0.479		0.515		0.439	
Kumasi (dummy variable)	0.505		0.520		0.489	
Religion						
Protestant (dummy variable)	0.372		0.387		0.356	
Catholic (dummy variable)	0.115		0.098		0.133	
Other Christian (dummy variable)	0.430		0.461		0.394	
Muslim (dummy variable)	0.055		0.039		0.072	
Other (dummy variable)	0.010		0.005		0.017	
None (dummy variable)	0.018		0.010		0.028	
relgious attendance (times per month)	14.852	30.307	12.992	25.255	16.960	35.122
associational activity (hours per month)	2.924	5.608	2.976	5.757	2.866	5.449
voluntry work (hours per month)	0.831	2.372	0.845	2.651	0.816	2.016
let down by a friend (times in last year)	0.500	1.196	0.426	0.987	0.583	1.394
subjects (in session)	24.086	10.968	23.980	10.844	24.206	11.135
s_j/y (trust measure) (si/y for second players)			0.452	0.295	0.529	0.241
r_i/s_i (trustworthiness measure)					1.490	0.570
Characteristics of potential trustees						
$Exp(r_i/s_i)_j$			1.482	0.164		
$Exp(R(X_{1i}))_j$			1.496	0.101		
proportion of females			0.235	0.302		
mean age			29.163	4.705		
mean education			10.056	1.542		
proportion married			0.353	0.196		
mean number of children			1.112	0.710		
mean ln(total income)			5.384	0.420		
mean years in work place			5.070	2.214		
proprotion of part timers			0.121	0.246		
mean religious attendance			15.407	10.935		
mean associational activity			3.716	2.541		
mean voluntary work			0.767	0.637		
mean number of illnesses			0.358	0.184		
proportion unemployed			0.105	0.089		
mean let down by a friend			0.528	0.461		
proportion who are indigenous			0.467	0.293		
proportion with same ethnicity			0.481	0.293		
proportion with same religion			0.384	0.212		
proportion of same sex			0.828	0.828		
Observations	384		204		180	

Table 4: The determinants of trustworthiness, r_i / s_i

	1	2
female	0.039	
	[0.099]	
age	0.001	
	[0.006]	
education	0.011	
	[0.011]	
married	0.189	
	[0.100]#	
ln(total income)	-0.050	
	[0.060]	
years in workplace	-0.009	
	[0.014]	
associational activity	-0.008	
	[0.010]	
children	0.016	0.038
	[0.031]	[0.020]#
part time	-0.323	-0.261
	[0.107]**	[0.115]*
unemployed	-0.261	-0.180
	[0.118]*	[0.082]*
illness	-0.289	-0.293
	[0.088]**	[0.091]**
indigenous to area	0.189	0.191
	[0.092]#	[0.089]*
religious attendance	0.004	0.003
	[0.002]*	[0.001]*
voluntary work	0.055	0.044
	[0.016]**	[0.011]**
let down by a friend	-0.041	-0.037
	[0.020]#	[0.019]#
subjects	-0.007	-0.005
	[0.003]*	[0.003]#
constant	1.761	1.582
	[0.380]**	[0.127]**
Observations	180	180
R-squared	0.174	0.152

Robust standard errors in brackets
significant at 10% level; * significant at 5% level; ** significant at 1% level

Table 5: Trust, s_j / y, as a function of trustors' characteristics and potential trustees actual and predicted behaviour

	1 OLS	2 OLS	3 WLS	4 OLS
age	-0.005			
	[0.003]			
married	0.026			
	[0.069]			
children	0.007			
	[0.023]			
years in workplace	0.006			
	[0.005]			
part time	-0.020			
	[0.057]			
unemployed	-0.120			
	[0.095]			
illness	0.026			
	[0.036]			
indigenous to area	0.045			
	[0.048]			
religious attendance	$3.79e^{-4}$			
	[0.001]			
associational activity	0.006			
	[0.004]			
let down by a friend	-0.003			
	[0.010]			
subjects	$3.32e^{-4}$			
	[0.001]			
female	-0.121	-0.110	-0.109	-0.111
	[0.046]*	[0.047]*	[0.052]*	[0.044]*
education	0.012	0.012	0.015	0.012
	[0.006]*	[0.004]*	[0.006]*	[0.005]*
ln(total income)	0.071	0.078	0.092	0.078
	[0.029]*	[0.020]**	[0.026]**	[0.020]**
voluntary work	-0.018	-0.014	-0.013	-0.014
	[0.010]#	[0.008]#	[0.008]	[0.008]#
$Exp\,(r_i/s_i)_j$			0.019	
			[0.082]	
$Exp\,(R(X_{1i}))_j$				0.011
				[0.075]
Constant	0.045	-0.046	-0.177	-0.054
	[0.166]	[0.118]	[0.138]	[0.130]
Observations	204	204	204	204
R-squared	0.147	0.109	0.148	0.110

Robust standard errors in brackets
significant at 10% level; * significant at 5% level; ** significant at 1% level

Table 6: Trust, s_j / y, as a function of potential trustees' characteristics

	Trust			
	1	2	3	4
female	-0.110	-0.091	-0.042	-0.039
	[0.047]*	[0.042]*	[0.052]	[0.051]
education	0.012	0.013	0.014	0.013
	[0.004]*	[0.007]#	[0.005]*	[0.005]*
ln(total income)	0.078	0.105	0.092	0.094
	[0.020]**	[0.030]**	[0.024]**	[0.025]**
voluntary work	-0.014	-0.016	-0.016	-0.016
	[0.008]#	[0.010]	[0.009]	[0.009]
proprotion of part timers		0.120		
		[0.083]		
mean number of illnesses		0.045		
		[0.136]		
proportion unemployed		-0.106		
		[0.233]		
mean let down by a friend		0.014		
		[0.048]		
proportion who are indigenous		-0.039		
		[0.098]		
mean voluntary work		0.073		
		[0.021]**		
mean number of children		-0.069	-0.057	-0.046
		[0.026]*	[0.020]**	[0.021]*
mean religious attendance		0.003	0.002	0.002
		[0.001]*	[0.001]*	[0.001]**
mean age		0.001		
		[0.012]		
mean education		0.003		
		[0.012]		
mean years in work place		-0.010		
		[0.014]		
proportion married		0.294		
		[0.161]		
mean ln(total income)		-0.141		
		[0.089]		
proportion of females		-0.187	-0.182	-0.204
		[0.093]#	[0.079]*	[0.083]*
mean associational activity		0.020	0.013	0.015
		[0.007]**	[0.005]*	[0.005]**
proportion with same ethnicity		0.065		
		[0.078]		
proportion with same religion		0.019		
		[0.105]		
proportion of same sex		-0.130		
		[0.106]		
Exp $(R(X_{1i}))_j$				-0.204
				[0.118]#
constant	-0.046	0.463	-0.131	0.147
	[0.118]	[0.317]	[0.128]	[0.197]
Observations	204	204	204	204
R-squared	0.109	0.181	0.153	0.157

Robust standard errors in brackets
significant at 10% level; * significant at 5% level; ** significant at 1% level