THE DETERMINANTS OF TRUSTING AND RECIPROCAL BEHAVIOUR: EVIDENCE FROM AN INTERCULTURAL EXPERIMENT

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In this paper we provide evidence that trust and reciprocity, the two key elements of social capital, are affected by country differences. Based on the amounts sent and returned in the investment game by student subjects we find evidence on trusting and reciprocal behaviour and we show significant cross-country differences between the levels of trust and reciprocity.

We also show that the answers for 'trust in strangers' type attitudinal questions have a significant effect either on trusting or reciprocal behaviour, while gender does not affect any of them. We report that reciprocity is affected by the same variables as trust: in particular stated trust has a significant influence on reciprocal behaviour, which can be explained by attitudes such as projective reasoning.

Furthermore, we find that questionnaire based rankings of countries are poor predictors of trusting behaviour rankings, which is mainly due to the differences in strength of correlation between stated trust and trusting behaviour country-by-country.

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1.   INTRODUCTION

The term of *social capital* has appeared at first about hundred years ago and meant mainly the community relations, sympathy among the members of the community and peaceful coexistence. At that time this term was considered much more as a sociological than an economic term. Several decades passed until economists have brought up the idea that social capital - in a significantly widened and completed meaning - may have an influence on economic performance. Social capital as an economic term consists of many elements - besides the 'original' ones - like cooperation in community, civic norms and networks, trust, reciprocity, social relations, etc. Selected references for the concept of social capital are Coleman (1988, 1990), Bourdieu (1993), Putnam (1993), Winter (2000), etc.

The idea, that *trust* is a key element of social capital that affects many aspects of economic life has already been pointed out in the beginning of the '70s (Arrow (1972, 1974)). Recently, a growing literature has developed a variety of arguments supporting the view that trust plays a central role in economic life and therefore, affects global economic performance indicators. Selected references are Fukuyama (1995), La Porta *et al.* (1997), Knack and Keefer (1997), Zak and Knack (2001), James (2002), etc.

In the last ten years several empirical evidences were provided on the positive relation between economic performance indicators and the level of trust within society. For example, based on a sample of 41 countries, Zak & Knack (2001) showed that over the period 1970-92, there is a positive and significant correlation between the growth rate and a trust indicator and that a similar relation holds for the Investment/GDP ratio. Or as an other example Knack and Keefer (1997) showed that 10%-point raise in trust variable results 0.80%-point increase in per capita GDP growth rate in case of market economies.

A major reason for such positive effects seems to be that trust is more frequently reciprocated than exploited by trustees. *Reciprocity* guarantees that trust achieves additional mutual beneficial outcomes for trustors and trustees, which would not be attainable in the case of distrust. Furthermore, reciprocal attitudes allow trusting behaviour not only to survive but eventually to be reinforced in situations of repeated interactions.

Much of the available empirical literature supporting the "trust-performance" relation is based on answers to survey questions about trusting behaviour. Three internationally known and used surveys have to be mentioned: the General Social Survey (GSS), the World Values Survey (WVS) and the European Social Survey (ESS) as the most recent one. The trust indicator of all these surveys measures the percentage of respondents who answer "can be trusted" to the following question: "*Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?*". Thanks to the GSS and WVS, the trust indicator is now available for many countries - approximately 100 countries.

The first wave of GSS was run in 1972 in some OECD countries and until 1990

more than twenty data collections were carried out in more and more countries. The WVS has already four waves, the first one in 1981, the second one in 1990-91, the third one in 1995-96 and the most recent one in 2000-01. In the last wave already more than 100 countries were involved, among others, most of the Eastern European and post-Soviet countries.

Unfortunately, the survey based trust indicators do not necessarily provide a reliable measure of trusting behaviour. For example, Glaeser *et al.* (2000) found that the WVS trust indicator is a poor predictor for trusting behaviour of subjects in an experimental game of trust. Instead, they found that a subject's past trusting behaviour is a much better predictor.

Although results from GSS or WVS well represent the population of each country by a large and well designed subject pool, an important source of defect is still present as questions in surveys are sometimes difficult to interpret and therefore variations in responses may arise. The most frequent arguments against the clear interpretation of trust question are the following: (1) there must be significant differences between individuals according to what they understand on the expression "most people", since typically everybody think on a group of similar people when "most people" is heard; (2) the exact meaning of "can be trusted" also varies from one person to another, since typically everybody think on different things on stake when they generally have to trust; (3) each responder's ability can be different in eliciting trustworthy behaviour from other people.

Another important argument is from Schwarz (1999) about the reliability of survey questions. If the subject of a question is the responder himself, the probability of distortion in the answer is highly increased. Furthermore the absence of willingness to answer truthfully can be mentioned in the case of some responders.

But even if a question is drawn up very precisely and we suppose that the meaning of it is completely the same for everyone - as well as the willingness for a truthful answer is given -, the main uncertainty is still present: for a strongly hypothetical question only a hypothetical answer can be replied with only two possible outcomes, which are 'yes' and 'no'. At this point two problems arise: (1) this hypothetical answer can be considered only as an expressed trust which is expectedly not the same as trusting behaviour fuelled by emotions during real actions; (2) the alternative possible answers for the trust question do not allow us to differentiate between levels of trust and it is easy to realise that all those people who answered 'can be trusted' for the trust question do not necessarily feel the same level of trust towards other people.

Therefore, an alternative to field studies for measuring trust is laboratory controlled experimentation. Although experiments are generally performed on smaller samples, they provide better controlled data than surveys. In particular they allow for precise observation of subjects' behaviour in social interactions, such as trusting behaviour which might differ from stated trust.

Although our samples with 20 observations (for Budapest and Miskolc 40 observations) are relatively small samples and are not representative for the countries,

they can be considered as adequate for an international comparison of student subjects' behaviour, since we ensured homogeneity, subject pool equivalence and included many cross-country controls in our study. Because of this high level of control, if a significant difference appears across our small samples at the 5% level then it should occur mainly because of country differences among our student subjects. Other experiments on trusting behaviour typically use comparable sample sizes.

Experimental evidence of trusting behaviour in the lab was first shown by Berg *et al.* (1995), on the basis of the "investment game". Recent contributions by Bolle (1998), Cox (1999), Ortmann *et al.* (2000) and Chaudhuri *et al.* (2002) as well as others confirmed these findings. Furthermore, several recent experiments showed that trust is affected by many factors such as gender, culture, religion, etc.

At first Buchan *et al.* (2000) applied the so-called investment game to test country differences and they found that Chinese subjects were significantly more trusting than US subjects, while Korean and Japanese subjects exhibited no such differences compared to US subjects. The results of Bohnet *et al.* (2004) and Koford (2001) also support the theory of declining social capital in the USA. Comparing European countries for example Willinger *et al.* (2003) reported that German subjects expressed significantly higher level of trust than French subjects.

It is important to note that significant differences in social capital can be observed even within a culturally heterogeneous country. Fershtman and Gneezy (2001) showed within the Jewish community that Jews of Eastern origin are significantly less trusted than Jews belonging to the Ashkenazic ethnic group. Danielson and Holm (2007) compared the trusting and reciprocal behaviour of Tanzanian students and churchgoers and found that determinants of their behaviour are significantly different. Holm and Danielson (2005) also compared the 'Nordic and tropic trust' and found no significant differences in case of average levels of trust and reciprocity between Swedish and Tanzanian students, although the determinants of their behaviour are significantly different. Some studies - carried out in primitive societies - reported on very low level of individual social capital (selected references are Ensminger (2000) and Henrich *et al.* (2001)).

Our first aim with this international experiment is to isolate the effect of country differences on trusting and reciprocal behaviour. We therefore chose four different venues with strong societal and cultural differences: Campinas (Brazil), Athens (Greece), Moscow (Russia) and Budapest & Miskolc (Hungary). To guarantee subject pool equivalence at all venues, all participants were students of large national universities.

There is no doubt, that Brazil as the largest country in South-America has a completely different culture than any countries in Europe, no matter if Western or Eastern European countries are considered. Even in Brazil - due to its territorial and population size - there are huge differences between north and south, therefore it was impossible to represent Brazil with a small and homogenous sample. We decided to carry out this experiment in Campinas which is considered as one of the richest cities in Brazil where almost all students come from rich families.

Greece is a well developed member country of the European Union belonging to South Europe, the Mediterranean region which affects significantly the culture and mentality of its population. The venue of the experiment was the University of Athens.

Hungary has a transition economy recently joined to the European Union, after a more than 40 years period belonging to the soviet era. Student participants of the experiment are aged between 18 and 25, which means that all of them were affected by both political systems and especially by the difficulties of transition. The experiments were carried out in two venues: at the Budapest University of Technology and Economics (the largest university in Hungary) and at the University of Miskolc (the largest university in Hungary outside Budapest).

Russia, as it is well known, was the most important member state of the Soviet Union which regime had dominant effects on culture and behaviour of the population. We chose the capital, Moscow to observe the trusting behaviour of students. Naturally, students from Moscow do not represent the whole Russia since there are significant differences between the behaviour of Russian students in urban or rural areas (see Gächter and Herrmann (2006)).

The experiment was based on the one-shot investment game by Berg *et al.* (1995). In each venue, 2 sessions involving 10 subject-pairs per session were organised which meant equally 20 observations in Campinas, Athens and Moscow. As mentioned above, in Hungary, the experiment was run in two venues: Budapest & Miskolc, with 2-2 sessions which resulted in 40 observations. With Man-Whitney and other statistical tests we did not find any significant differences between the sub samples, neither in the case of trusting nor of reciprocal behaviour. Therefore the aggregation of the Hungarian sub samples can be accepted.

After playing the investment game, subjects had to answer an additional questionnaire consisting of several, mostly attitudinal questions. One of the questions was similar to the 'trust in strangers' question of Glaeser *et al.* (2000) which is different from the questions asked in the large international surveys, like WVS or GSS. We define the answers given for this question as stated trust in our study. At the end of each session, data about individual characteristics were collected (gender, age, income group, etc.).

Our main findings are that trusting behaviour is significantly affected by country differences and by the variable of a special trust related attitudinal question. Since the general trust question of international surveys like GSS or WVS failed to predict well the trusting behaviour, the more unambiguous question of "trust in strangers" was developed by Glaeser *et al.* (2000), which turned out in our results as a significant determinant of trusting behaviour.

We also find that variables which have a significant influence on trust vary according to venues. A comparison of trust related rankings of countries is also provided with a conclusion, that questionnaire based trust rankings poorly predict ranking of trusting behaviour. Furthermore, we show that reciprocity is affected by the same variables as trust. In particular stated trust has a significant influence on reciprocal behaviour in the investment game.

Section 2 overviews the methodological issues of the cross-country experiment. In section 3 we compare the amounts sent by trustors in different venues, as well as the rankings of countries according to stated trust during the experiments, stated trust in the WVS and trusting behaviour measured in the lab.

In section 4 the analysis of percentages returned by trustees is provided, while section 5 summarises and concludes the results.

2. METHODOLOGY

2.1. Experimental Design

Arriving at the experimental lab, subjects were assigned randomly either to room A as player A, or to room B as player B. To implement the investment game, we used a triple-blind procedure, slightly different than the one used by Berg *et al.* (1995). Our implementation of the investment game involves passing envelopes between rooms A and B, with the experimenter in room C recording the decisions and manipulating the given amounts.

One of the participants in each session was randomly selected to act as a supervisor and assist the experimenter in room C. Each subject received an envelope marked by his/her personal identification number and 10 artificial Euro bills. Player A was asked to decide how much (if any) of his Euro bills he wanted to send to player B. After each player A had decided, their envelopes containing the amounts sent were collected and brought into room C where the experimenter recorded each individual decision and tripled the number of Euro bills that he put into the corresponding envelope for player B. Then the envelopes were sent to room B where each player B discovered the amount sent and decided how much he wanted to return to player A. After having decided the envelopes were collected again and brought in room C, where player B's decision was recorded and sent back to room A afterwards. At the same time, the B players filled out a questionnaire and were asked one by one to go to room C where their Euro bills were exchanged for the local currency (according to the announced conversion rate). Once, each player B was paid, A players (who in the meantime filled out their own questionnaire) were called one by one to room C to convert their Euro bills into the local currency. Each session lasted about 50 minutes.

Besides the amount sent and the amount returned, at the end of the experiment we also collected the following information in the submitted questionnaire: age, gender, the average amount of monthly available pocket money and their major (economics vs. other studies). Furthermore we asked all subjects to answer a questionnaire including the following trust question: "Would you trust in another person who you do not know?"[1].

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[1] This question is different from the trust question of the WVS: "Generally speaking, would you say that most

This question was asked to player A after he had decided upon the amount he wanted to send to player B. The question was included to check whether there is a correlation between elicited trust and stated trust. We also decided to ask the same trust question to player B after he had made his decision.

2.2. Subjects

Subjects were recruited in each university and selected according to the following two criteria: being native of the corresponding country and having been living in the country up to the age of 18. This was common knowledge in the instructions. The strict implementation of these two criteria is important especially in European countries where student subjects often participate in university exchange programmes.

These subjects were recruited by advertisements just as mail lists, posters, loud voice advertisements in classes, in order to ensure the widest possibility for all students getting information about the participation opportunity in the experiments.

2.3. Cross-Country Controls

Because of the international character of this experiment, several cross-country precautions had to be taken to guarantee that the observed differences cannot be attributed to differences in experimental conditions. Many potential sources of variations had to be taken into account: instructions, subject pools, currencies, experimenters, income groups, understanding of the instructions. Below we indicate how each of these potential sources of variation was handled.

Back-Translation

The original instructions were written in French and translated into other languages by natives of the country that were perfectly fluent in French. In order to avoid misinterpretations and possible confusions, instructions were back-translated by native French fluent in the foreign language.

Subject Pool Equivalence

Since at all venues the participants were graduate students and also the sample selection principles were exactly the same we assured the subject pool equivalence.

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people can be trusted or that you can't be too careful in dealing with people?", but it is in line with the 'trust in stranger' variable of Glaeser *et al.* (2000), which appeared as a significant determinant of trusting behaviour.

Currency Effects

Currency effects can be due to differences in numbers which imply different strategy sets, and differences in buying power. In order to generate equivalent strategy sets in each country we decided to use artificial bank notes, called "Euro", instead of the real local currency. The sum of artificial Euro was converted at the end of a session into the local currency, according to a predefined conversion rate. We controlled the purchasing parity by manipulating the conversion rate of Euro into the local currency.[2]

The conversion rates were adjusted in such a way that the buying power was approximately equal across countries. Since our subject samples consisted only of students, we relied on typical student expenditures.

Experimenter Effects

The project was coordinated by a team of graduate students who were studying in France when the experiment was run. All the details about conducting the experiment were discussed during the regular meetings of this group, to warrant that the same procedure would be applied in each country. For those countries that were not represented in the team, the main coordinator was present in each country in which the experiment took place to brief the local experimenter, and to control the implementation of the procedure.

Comprehensive Questionnaire

In each session instructions were read aloud, after subjects had already read them once. Each subject had to fill out a short questionnaire to check proper understanding of the instructions. In each room a monitor checked each subject's answers to this questionnaire.

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[2] The conversion rates were the following in each country:

Country	Conversion Rate	
	1 Experimental Euro = … Real Euro	1 Experimental Euro = … Currency
Brazil	0.27 Euro	1 Real
Greece	0.73 Euro	250 Drachma
Hungary	0.64 Euro	160 Forint
Russia	0.40 Euro	10 Rubel

Pocket-Money Groups

In the final questionnaire we asked subjects about their available monthly "pocket-money". We made clear for this question that by "pocket-money" we meant the money that was available to them after payment of regular expenditures such as housing, tuition, clothing and food expenditures. Since we expected considerable variations across and within countries the question was stated as an open-ended question. After collecting this data, we constructed in each country three pocket-money classes called "poor", "average" and "rich". These categories were constructed on the basis of the subject-pool income distribution.

3.   AMOUNTS SENT

3.1.   Pooled Data

Table 1.   Average Amounts Sent Per Venues and Per Subject Categories

University of	#	Average Sent	Gender			
			Male		Female	
			#	Mean	#	Mean
Campinas	20	5.90	11	5.91	9	5.89
Athens	20	3.45	7	4.43	13	2.92
Budapest & Miskolc	40	5.68	23	5.44	17	6.00
Moscow	20	5.90	10	6.90	10	4.90
Total	100	5.32	51	5.69	49	4.94

	Faculty				Stated Trust			
	Economist		Non-Economist		Does Trust		Does Not Trust	
	#	Mean	#	Mean	#	Mean	#	Mean
Campinas	-	-	-	-	6	6.83	14	5.50
Athens	9	3.75	11	3.25	7	4.00	13	3.15
Budapest & Miskolc	13	4.62	27	6.19	20	6.45	20	4.90
Moscow	15	6.07	5	5.40	5	7.40	15	5.40
Total	37	5.00	43	5.34	38	6.18	62	4.79

Table 1 provides summary results for the amount sent. For the whole sample the average sent amount is 5.32 Euro from the possible maximum of 10 Euro. There is evidence of trusting behaviour in each of the countries. On average males send 0.75 Euro more than females, which difference just fails to be significant at the 5% level (Mann-Whitney U-test, one-sided). The gender effect is only significant for the case of Athens and of Moscow, suggesting that this effect might be strongly country-dependent.

Expectedly, economists send a slightly lower amount than non-economists, but the difference is not significant for neither of the countries (Mann-Whitney, one-sided)[3]. Finally, our data shows that subjects, who state that they would trust, send on average 1.39 Euro more than subjects who state that they would not trust. This is a strong effect of stated trust since it is significant at the 2% level (Mann-Whitney, one-sided). This effect of stated trust is not significant for neither of the sub samples, but for the total sample. The finding that self-reported question of 'trust in strangers' significantly affects the level of trust is in line with the results of Glaeser *et al.* (2000). It should be noted, that Burks *et al.* (2003) found that a comparable trust question has no significant effect on the amount sent.

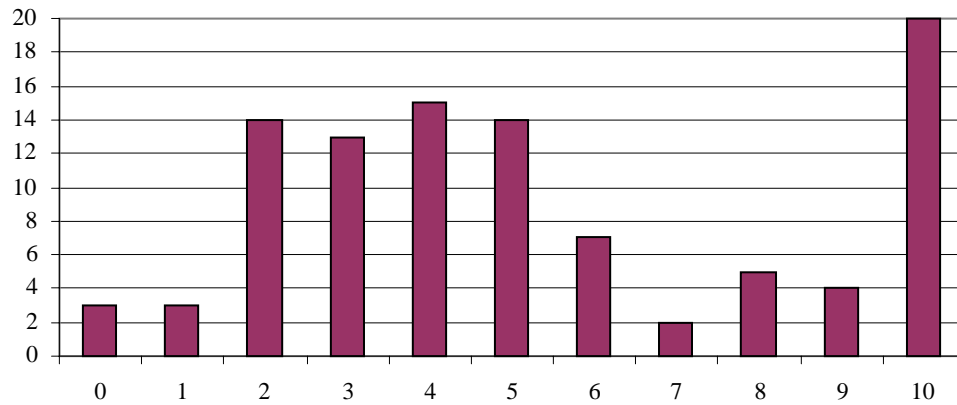Distribution of Sent Amount (total sample)

Figure 1.   Frequency Distribution of Amounts Sent in the Whole Sample

Figure 1 shows the frequency distribution of amounts sent for the pooled data. Most of the subjects send an amount between 2 and 6. There is a spike at 10, which

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[3] Since we are not sure that the subjects could exactly and unequivocally answer the question about their monthly pocket money the pooled data and further analyses do not contain it as an independent variable of trust. Pocket money has a surprising effect on the amount sent. On average poor and rich subjects send less than the subjects in the average category. However, this effect is only due to the Greek and the Hungarian students, and is significant only for the Hungarian students (median test, two-sided). Furthermore for the Brazilian sample we observe the opposite effect: both the "poor" and the "rich" send more than the average category.

corresponds to full trust (20% of the subjects). At the other extreme, there are only 3 subjects (out of 100) who chose to send zero (the subgame perfect equilibrium).

These observations are comparable to other distributions found in the literature. For example, in the data of Berg *et al.* (1995) and Willinger *et al.* (2003), typical sent amounts range between 2 and 6 except for the peak at 10. In the data of Willinger *et al.* only 4 subjects out of 60 sent different amount than the mentioned ones (2 to 6 or 10 Euro). In our case 17 out of 100 subjects sent 0, 1 Euro or between 7 and 9 Euro (which are the non-typical sent amounts in the literature). It is noteworthy that in our sample the ratio of subjects who sent their total endowment (20/100) is lower than the ratio obtained by Willinger *et al.* (17/60).

3.2. Country Differences in Amount Sent

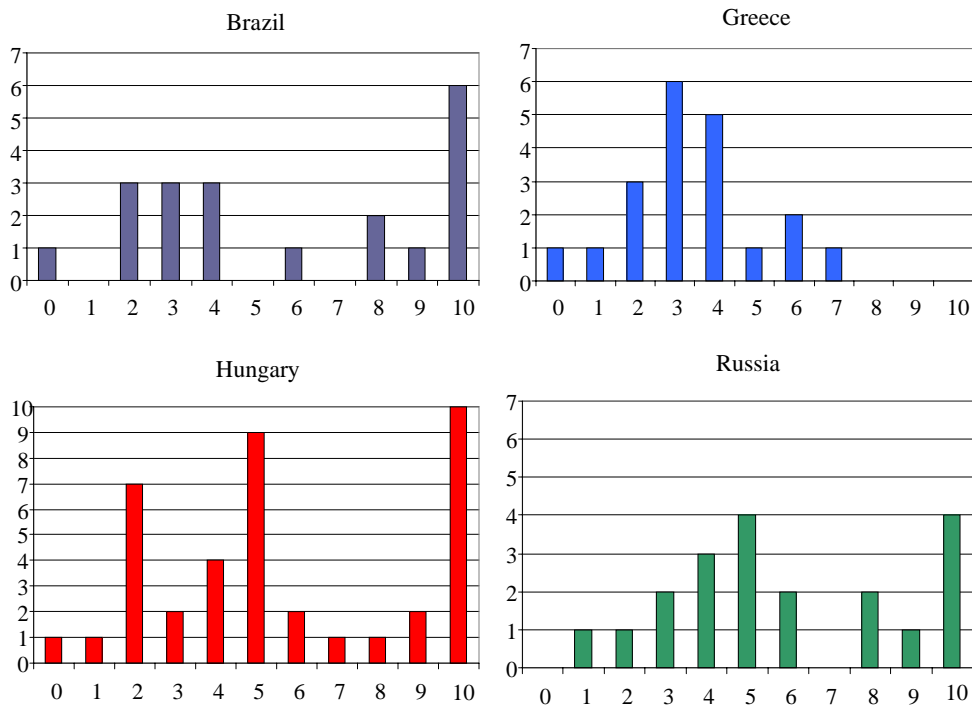**Figure 2**.   Distribution of Amounts Sent Sample by Sample

Figure 2 shows the frequency distributions of sent amount among venues. The distributions for Campinas (Brazil), Budapest & Miskolc (Hungary) and Moscow (Russia) exhibit similarities, in particular the strong spike at 10 which does not exist in the case of Athens (Greece). Indeed, there are only three significant differences across

these distributions (Kolmogorov-Smirnov, double-sided): Campinas, Budapest & Miskolc and Moscow have significantly different distributions than Athens. It is noteworthy that the sample of Campinas does not exhibit a peak at 5 in contrast to Budapest & Miskolc and Moscow.

In table 2 the results of the Mann-Whitney test are shown (one-sided) for the amount sent. The line venue is compared to the column venue, and we indicate whether the difference is significantly larger (+) or lower (-) or not significant (0). We also include in this comparison data collected for other countries by independent studies (Berg *et al.* (1995) for the case of US subjects - Minnesota - and Willinger *et al.* (2003) for French - Strasbourg - and German - Karlsruhe - subjects).

Since these data were collected under slightly different conditions[4], the comparison is less powerful. However, according to our opinion it is nevertheless meaningful, since these experiments had the same strategy spaces as ours for both players, and the monetary incentives were comparable. Though, the data about explanatory variables (gender, trust, …) were not collected.

Table 2.   Cross-Country Comparisons of Amounts Sent

	Athens	Bp. & M.	Moscow	Strasbourg	Karlsruhe	USA
Campinas	+	0	0	0	0	0
Athens		-	-	0	-	-
Bp. & M.			0	+	0	0
Moscow				+	0	0
Strasbourg					-	-
Karlsruhe						0

Note: 0 = not significant, + = the line-venue sends more, - = the line-venue sends less

Within our samples, we find that the students from Campinas, Budapest & Miskolc and Moscow send significantly more than the students from Athens. Comparing the venues in our samples with other samples, we find that the significant differences are that the German and the US students send more than the Greek students, and that the Hungarian and Russian students send more than the French students.

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[4] While Berg *et al.* and Willinger *et al.* used double blind procedure we conducted our experiments in triple blinded circumstances, where neither the experimenters nor the subjects playing the opposite role and the same role were able to know the decision made by a participant.

3.3. Regression Analysis of the Amount Sent

Table 3 summarises the significant regression coefficients for the whole sample, determined by backward elimination. It must be noted, that for the sample-by-sample regression we did not find any of the variables to be significant in the case of Moscow and Campinas. In the case of Campinas the trust variable was the last to be eliminated but failed to be significant. However, for Hungarian students pocket money, and for Greek students gender, trust and pocket money turned out to be significant.

We also found that there is no "faculty effect", i.e., economists do not behave differently in their trusting behaviour compared to other student subjects.

Table 3. Significant Regression Coefficients for the Total Sample

Independent Variables	Coefficients
Constant	2.98
Stated Trust	1.34*
	(0.593)
Country Dummy	2.29**
	(0.720)
s	2.87
R^2	13.9%

Note: * significant at the 5% level, ** significant at the 1% level (standard errors).

For the whole sample, only two variables are significant: stated trust and a dummy variable for country effect. We constructed all possible country dummy variables by grouping data from different countries into two sub-samples. Only one of the dummy variables turned out to be significant: Russian, Brazilian and Hungarian students on the one hand, and Greek students on the other hand, with subjects in the former group sending on average 2.29 Euro more than subjects from Athens. This cross-country variable has the strongest explanatory power in our regression.

Subjects who stated that they would trust in a stranger send on average 1.34 Euro more than the other subjects. The constant is equal to the average sending of a Greek student who stated that he would not trust.

3.4. Comparison of Different Trust and Economic Performance Rankings

In this section at first the correlation between different rankings related to trust of different countries is tested. Three rankings were used (see Table 4): one based on the percentage of 'can be trusted' answers of WVS, an other one based on the ratio of 'yes' answers for our trust question and a third one based on trusting behaviour in our experiments.

Table 4. Questionnaire Based and Experiment Based Rankings Related to Trust

Trusting Behaviour			Stated Trust in Our Sample			WVS Trust Indicator		
Rank Nr.	University	Sent (Euro)	Rank Nr.	University	'Yes' (%)	Rank Nr.	Country	'Can Be Trusted' (%)
1.5	Moscow	5.9	1	Bud.&Mis.	50.0	1	Russia[5]	33.8
1.5	Campinas	5.9	2	Athens	35.0	2	Hungary	24.6
3	Bud.&Mis.	5.7	3	Campinas	30.0	3	Brazil	6.5
4	Athens	3.5	4	Moscow	25.0	-	Greece	n.a.

At first we compared the two questionnaire based rankings which resulted in a non significant, but negative signed coefficient ($\rho = -0.5$; Spearman Rank Correlation). This difference is most probably caused by a sample effect, as our sample is a homogenous small sample of university students while WVS sample represents each country well by large samples.

Secondly, the comparison of trusting behaviour and WVS rankings was carried out, which showed a positive but non significant rank correlation ($\rho = 0.13$). Also this time the absence of correlation can be due to the same sample effect as in the former comparison. Another reason could explain the difference: the subjects' behaviour is not correlated to their expressed trust in the questionnaire, because they do not act according to what they declare. This difference between intentions and actions was already pointed out by Glaeser *et al.* (2000). It can be called the "behavioural effect".

The absence of correlation between the rankings above could be due to sample differences. Therefore if we compare the rankings of stated trust and trusting behaviour on the basis of the same sample, the difference can no longer be attributed to sampling variations. Furthermore, we found in our total sample that stated trust has a significant effect on the amount sent in the investment game, a result which contradicts the "behavioural effect". Therefore, the absence of both sampling differences and "behavioural effect", leads us to predict a positive and significant correlation between the two rankings obtained from the same sample. Results do not support this prediction, with a rank correlation of $\rho = -0.65$ we can conclude that the largest difference between the two rankings is observed on our sample.

Why none of the questionnaire based rankings are adequate predictors of the ranking based on trusting behaviour? Our answer is that - despite the evidence as one's positive thinking about the trustworthiness of strangers positively affects his trusting behaviour - the measure of this positive effect strongly varies among countries (see table 3 for significant dummy variable for country effect) which results in differences between the

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[5] Since our Russian experiment was run only in Moscow, we only used those data from the WVS which were collected in Moscow.

two rankings. Even though that in the total sample stated trust positively affects the amount sent, the effect of the country dummy variable also affects the trusting behaviour ranking of the countries. Our conclusion is that both questionnaire based trust rankings are poor predictors of experimentally measured ranking of trusting behaviour, even in those cases when the behavioural effect is not present.

However, it also has to be noted that these rankings were based on the results from only four - in the case of WVS ranking even less - countries, which are all considered as 'low-trust' countries. In case of very small samples like this, a little difference in the rank numbers cause significant differences in rank correlations, especially when the ranked venues show large similarities (i.e., in case of trusting behaviour ranking Moscow, Campinas and Budapest & Miskolc have almost the same average sent amount, but their rankings are highly different).

A more powerful comparison could be done if more countries, possibly either low or high trust countries were involved to ensure a greater variety between venues according to trusting behaviour.

4. RECIPROCITY

4.1. Pooled Data

Table 5. Average Percentages Returned Per Venues and Per Subject Categories

University of	#	Average Returned	Gender			
			Male		Female	
			#	Mean	#	Mean
Campinas*	19	44.1%	11	44.5%	8	43.6%
Athens*	19	28.4%	5	21.1%	14	31.0%
Budapest & Miskolc*	39	44.6%	32	46.0%	7	37.9%
Moscow	20	50.7%	5	38.7%	15	54.7%
Total	97	42.6%	53	42.7%	44	42.5%

	Faculty				Stated Trust			
	Economist		Non-Economist		Does Trust		Does Not Trust	
	#	Mean	#	Mean	#	Mean	#	Mean
Campinas*	-	-	-	-	7	56.4%	12	37.0%
Athens*	9	32.5%	10	24.8%	6	35.2%	13	25.3%
Budapest & Miskolc*	4	33.3%	35	45.9%	14	44.6%	25	44.6%
Moscow	16	47.7%	4	62.5%	7	59.4%	13	46.0%
Total	29	41.0%	49	42.9%	34	48.4%	63	39.4%

Note: * 1 observation excluded because amount sent was zero.

On average, females return almost the same shares as males, and in our sample there is no evidence on the well-known gender effect of reciprocity which states that females are more reciprocal than males. It should be noted, that Buchan *et al.* (1999) found a significant gender effect among the Chinese, Japanese, Korean and US subjects.

In Campinas and in Budapest & Miskolc, males return larger shares than females, while in Athens and in Moscow the opposite is observed, but the difference is significant only for Athens (Mann-Whitney, one-sided).

Though non-economists return larger shares compared to economists, the difference is significant for none of the samples (Mann-Whitney, one-sided).[6]

Finally stated trust increases the percentage returned in a significant proportion (Mann-Whitney, one-sided). It is however noteworthy that those B players who state that they would trust, return on average 9% more than B players who state that they would not trust. *Projective reasoning provides a possible explanation for such type of behaviour.* Projective reasoning comes from the psychological term of projection, which means in a wider sense not only a self-defense mechanism, but a way of understanding and handling new situations. When one acts in a completely new situation - like the case of inexperienced subject in the trust game - the understanding of the whole situation starts from his previous life-experiences and initial assumptions about the new situation. This 'subjective projection' helps one to react on the first mover's action according to his initial assumption about this action, i.e., how he would act if he was the first mover.

Briefly, the reason of this behaviour may be that those B players, who trust others, might expect their trust to be honoured. In other words it means that a subject will do unto others exactly what he expects others to do unto him. In the investment game this implies honouring trust in the same way as he would expect to be honoured.

It is important to note, that in trust games where both roles are played by the participants both the level of trust and the level of reciprocity decreased as it was shown by Burks *et al.* (2003) and explained with the *Reduced Responsibility Hypothesis.*

Figure 3 shows the frequency distribution of returned percentages classified into 10% intervals. Values on horizontal axis mean the upper limit of a certain interval, i.e., the height of the bar above 20% shows the frequency of returning larger shares than 10% but not larger than 20%.

On Figure 3 it can clearly be observed that the frequency distribution is bi-modal, with spikes at 30-40% (22 observations, from which 18 is at one-third) and at 60-70% (26 observations, from which 23 is at two-third). There are two lower spikes at 10-20% (15 obs.) and at 50-60% (16 obs.) among which one-sixth and one-half came up 8 and 9

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[6] Pocket money has a surprising effect, but in an opposite way as in the case of sent amount: participants with normal pocket money have the lowest level of reciprocity, lower than the poor and rich participants. Pocket money has a negative correlation with reciprocity level in Campinas (slightly fail the Median test, two sided) and in Budapest & Miskolc, while there is a positive correlation in Athens and in Moscow. But pocket money has a significant effect on the percentage returned only in the case of Athens (Median test, two-sided).

times. It should be noted that returning 33% means that player B keeps the whole net surplus from the investment of player A, and player A breaks even. 67% corresponds to equal split of the net surplus between the two players so that they end up with the same amount. 50% corresponds to equal split of the gross surplus, but player A receives only 25% of the net surplus, which implies an unequal distribution. Returning more than 67% was observed only once in our samples.
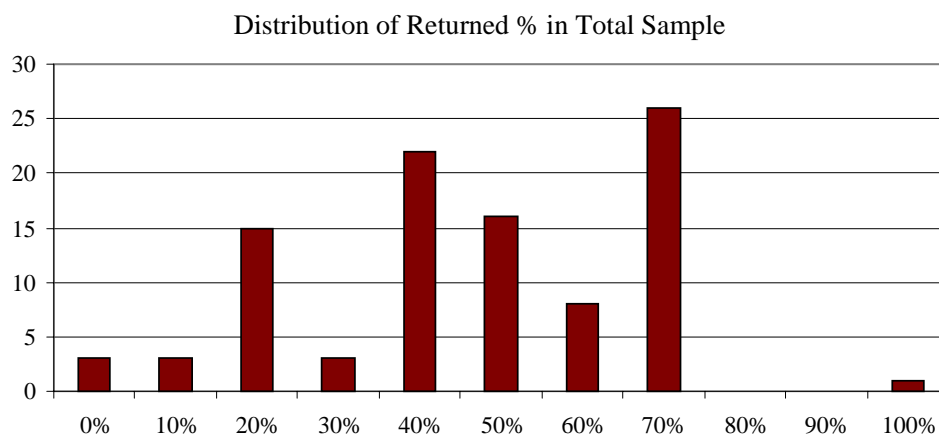
Distribution of Returned % in Total Sample

Figure 3. Frequency Distribution of Returned Percentages (Total Sample)

4.2. Country Differences in Reciprocity

Figure 4 shows the distributions of the percentage returned in different venues. Returning at least 33% was very frequent except for Greek students who frequently returned less. In Athens only 4 from 19 B players (who had the possibility to choose an amount different from 0 to return) sent back more than 33%, while more than half of them (10 subjects) returned even less than 33%.

The distributions in Moscow, in Campinas and in Budapest & Miskolc are almost the same, with two spikes at 33% and at 67%. In Campinas we observed a participant sending back the total amount received. Returning less than 10% could be observed 2 times in Campinas and 3 times in Budapest & Miskolc. It is important to note, that in Athens a significantly lower reciprocity level was observed than in any other venues (see table 7), but there never came up a return less than 10%.
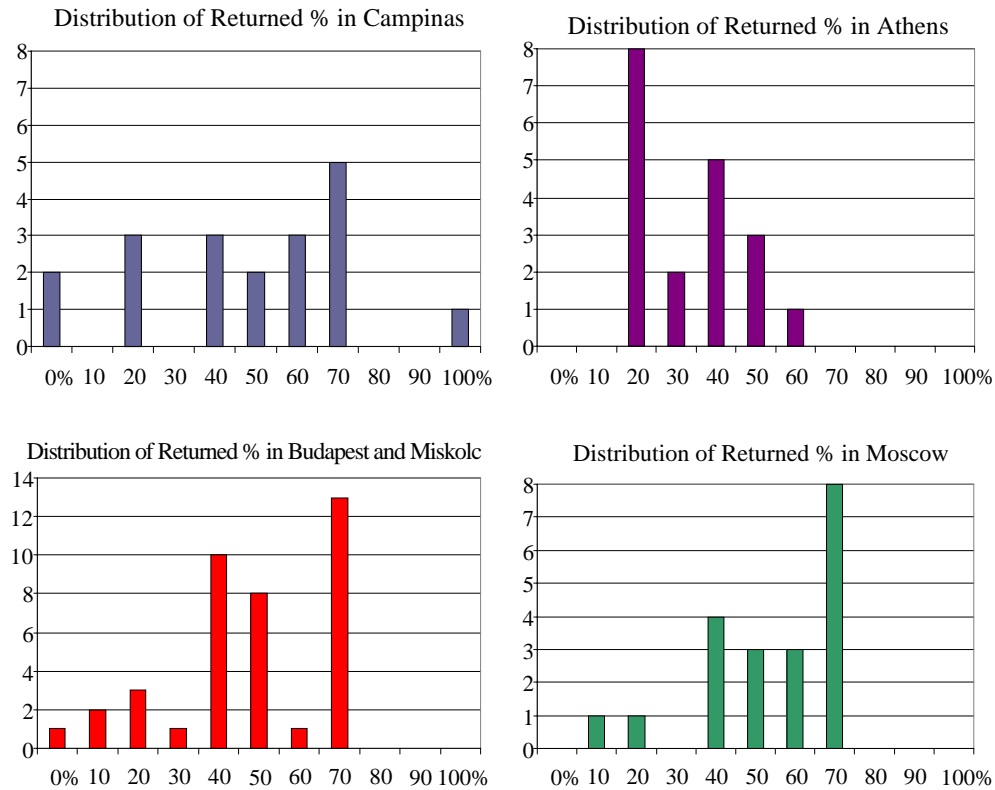
Distribution of Returned % in Campinas

Distribution of Returned % in Athens

Distribution of Returned % in Budapest and Miskolc

Distribution of Returned % in Moscow

Figure 4.   Frequency Distributions of Returned Percentages Sample by Sample

In Moscow 13 of 20 B players returned at least 50% with a spike at 67%. Only 2 participants sent back less than 33% of the received amount and there was no 0% at all.

In Table 6 the average levels of reciprocity can be compared sample-by-sample. It is noteworthy that in Moscow the participants returned on average almost the double percent of the received amount as the participants in Athens. Only in two cases (Athens and US sample of Berg *et al.*) are the averages below 33%. The returns of Hungarian, Brazilian, German, and French students are almost on the same level on average, the highest difference in reciprocity is 6% between these venues.

There are several significant differences in level of reciprocity across these 7 venues. The test results are detailed in table 7 (Mann-Whitney, one-sided).

Table 6. Average Returned Percentages in Our Samples and in Other Studies

University	Average Percentage Returned
Moscow	50.7
Budapest & Miskolc	44.6
Campinas	44.1
Karlsruhe	43.0
Strasbourg	39.0
USA	30.0
Athens	28.4

Table 7. Cross-Country Comparisons of Returned Percentages

	Athens	Bp. & M.	Moscow	Strasbourg	Karlsruhe	USA
Campinas	+	0	0	0	0	+
	Athens	-	-	-	-	0
		Bp. & M.	0	0	0	+
			Moscow	+	0	+
				Strasbourg	0	0
					Karlsruhe	+

Note: 0 = not significant, + = the line-venue returns higher shares, - = the line-venue returns lower shares

As in the case of trust, we include data from independent studies for Strasbourg, Karlsruhe and Minnesota. We use the same convention for table 7 as we used in table 2. The table shows that reciprocity is larger in Campinas, in Budapest & Miskolc, in Moscow, in Strasbourg and in Karlsruhe (the first five venues in table 6) compared to Athens (the last venue in table 6). Furthermore, in Campinas, in Budapest & Miskolc, in Moscow and in Karlsruhe reciprocity is larger than in Minnesota and finally students from Moscow are more reciprocal than students from Strasbourg.

It has to be mentioned, that our results are in line with the findings of Bohnet *et al.* (2004) according to which Russian subjects are significantly more reciprocal than US subjects and that trust pays the most in Russia.

According to these results we can split the venues into three groups. The first "group" contains only Moscow, the second group includes Campinas, Budapest & Miskolc, Strasbourg and Karlsruhe and the last group contains Minnesota and Athens. The participants in the first two groups are significantly more reciprocal than the participants from the third group - with only one exception: comparing Strasbourg to Karlsruhe just slightly fails the Mann-Whitney test, one-sided. The level of reciprocity was so high in Moscow that the difference to Strasbourg (with lowest level in the second group) is also significant.

4.3. Regression Analysis on Percentage Returned

Table 8 summarises the significant coefficients of a tobit-regression of returned percentage for the whole sample. The regression line was set up through using backward elimination of non-significant variables. In the case of subsamples (by venues) only one or none of the variables remained in the model (mainly due to low number of observations), therefore the regression analysis is presented only for the total sample.

Table 8.   Significant Regression Coefficients for the Total Sample

Independent Variables	Coefficients
Constant	0.2576
Stated Trust	0.0843*
	(0.042)
Country Dummy	0.1731**
	(0.051)
s	0.1974
R^2	14.7%

Note: * significant at the 5% level, ** significant at the 1% level, (standard errors).

Two variables are significant, stated trust and the dummy variable for country difference, determining the returned percentage. In contrast to other studies (e.g., Buchan *et al.* (1999) or Eckel and Grossman (1999)), in our sample we do not find a gender effect, i.e., that females return significantly more than males.

The regression also confirms the positive effect of own trust: a subject who answers 'yes' for the trust question returns on average 8.43% higher proportion of the received amount than a subject who answers 'no' for the question.

The independent variable having the strongest effect is the country dummy variable: a non-Greek student is more reciprocal than a Greek student and returns on average 17.31% more. Among these four venues we found the same country effect by the Mann-Whitney tests: Hungarian, Brazilian and Russian students return significantly more than Greek students.

The constant is 25.76%, which equals the average returning of a Greek student who answered 'no' for the trust question, which average value is also in line with our previous data in table 5.

4.4. Relation Between Received Amounts and Returned Percentages

As it is well-known from the literature, trust and reciprocity are two equally important factors of social capital, therefore the question may arise whether there is a positive link between them, or with other words: does higher level of trust induce higher

level of reciprocity?

Since received amount is determined by the amount sent by the trustor, if the above mentioned link exists then a significant and positive correlation should be found between received amounts and returned percentages. Figure 5 shows all received amounts in an increasing order together with the concerning returned percentages in the case of each venue.

It can be discovered on Figure 5 that there is no systematic positive correlation; returned percentages are independent from received amounts. Table 9 contains the Pearson correlation coefficients between these two variables for each sample and for the total sample as well. The results in table 9 also support the finding that reciprocal behaviour is independent from the trust exhibited by A players. In case of Moscow and Campinas the coefficient is even negative (suggesting that lower proportion is returned when higher amount is received) but insignificant, as well as in the case of the other two venues and the total sample.

The same result was found during the backward elimination in regression analysis: the variable of received amount has been dropped from the model in case of each sub-sample and also in the case of total sample. The highest, but still insignificant t-value in the step of elimination was recorded in the regression of the Budapest & Miskolc sample ($t = 1.05$; $p = 0.309$).

Considering all these results we conclude that reciprocal behaviour is much more affected by the answer of trustees for the 'trust in stranger' question than the level of trust exhibited by the trustors. This result is in line with our projective reasoning theory, since trustees are more likely to honour their partners as they would expect to be honoured if they were trustor, rather then honouring the level of trust expressed by their partners.

Table 9.   Correlation Between Received Amounts and Returned Percentages
in Each Venue and in the Total Sample

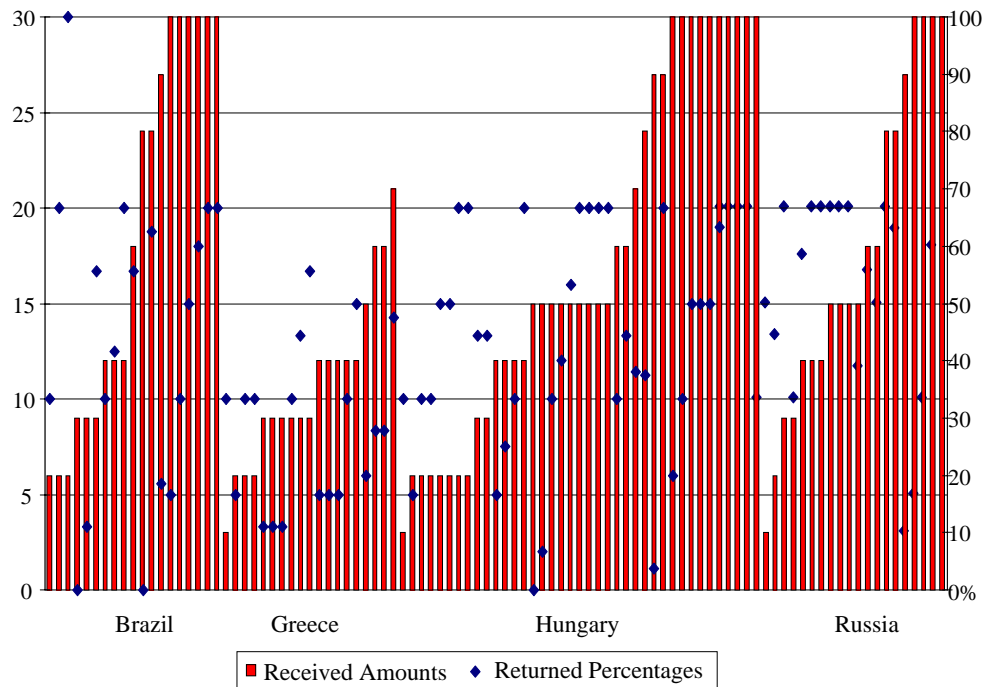| University of	r	p
Campinas	-0.066	0.787
Athens	0.103	0.675
Budapest & Miskolc	0.165	0.314
Moscow	-0.289	0.216
Total	0.109	0.288

Figure 5.   Amounts Received and Percentages Returned by Trustees in Each Venue

5.   CONCLUSION

In accordance with other studies (Glaeser *et al.* (2000), Burks *et al.* (2003), Brülhart and Usunier (2004), etc.) we did not find a significant gender effect for the amount sent in the case of the pooled data, although on average men sent more than women. However, in two of the four venues males sent significantly higher amounts than females (in Athens the difference was 1.51 Euro and in Moscow it was 2 Euro). In Campinas there was no difference, while in Budapest & Miskolc females sent insignificantly higher amounts than males. This result suggests that the effect of gender may be highly country dependent in case of sent amount.

There is also mixed evidence on the effect of gender in case of reciprocity. Women return larger shares than men only in half of the observed venues: in Moscow and in Athens, but the difference is only significant in the latter case. It has to be noted that Buchan *et al.* (1999) found in their Far-East and US sample that women return a significantly larger share (about 9% more) than men and Burks *et al.* (2003) also found significant gender effect in their treatments (females return on average cca. 2.5$ more than males). These results provide further support for the country dependency of gender

effect.

In case of the total sample it was shown that the variable of the self-reported question of 'trust in strangers' significantly determines both the levels of trust and reciprocity. Subjects who stated that they would trust in a stranger sent on average 1.34 Euro more and returned on average 8.43% more of the received amount than subjects who would not trust. This finding is in line with the results of Glaeser *et al.* (2000), who showed that from several trust related survey questions only the 'trust in strangers' type question has a significant effect on trusting behaviour.

Furthermore we found in our international comparison a strong and clear cross-country effect between students from Athens and students from other venues. Greek students send on average 2.29 Euro less and return on average almost 18% less of the received amount than non-Greek students and this effect is significant at less than 1% level. Furthermore, we also found that reciprocity level of Russian students is outstandingly high, which is in line with the results of Bohnet *et al.* (2004). These results show that not only the level of trust but the level of reciprocity is highly country dependent.

Finally, the comparison of different trust rankings was also carried out which resulted that no significant rank correlations could be found. The more probable reason for the absence of correlation between the WVS trust ranking and the rankings based on our results is the sampling difference. However - despite the positive effect of stated trust on sent amount - also no positive correlation was found between the rankings of stated trust and trusting behaviour. This can be due to two effects: the strength of the positive effect of stated trust on trusting behaviour may be different country-by-country and the variable of stated trust is only one determinant of sent amount - beside the dummy variable of country -, which may lead to variations in the different trust rankings.

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