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Fairness as a Constraint on Trust in Reciprocity

An Experimental Observation

by

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Abstract

We describe three different treatments of a one-shot trust experiment in which we vary the outcome considered to be fair by inducing different entitlements. Subjects obtain property rights by performing a real effort, non-competitive working task. As expected, we find that the Trustees reciprocate significantly more the more the Trustors are entitled. However, our results unambiguously refute strategic reliance of the Trustors on the reciprocal behavior of the Trustees. Instead, the Trustors tend to aim at unilaterally implementing a fair outcome. Thus our observations provide strong evidence that the fairness norm is much more decisive than trust in the norm of reciprocity.

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I. Introduction

A huge amount of economic literature outlines the importance of *social norms* (for an overview see e.g. RABIN 1998, ELSTER 1989). In these studies economists are mainly puzzled about the influence of norms which cause deviations from rational behavior. In fact, the vast majority of recent studies has accepted rationality *and* social norms as motivational mechanisms and argues that actions are typically influenced by both (e.g. RABIN 1993, FEHR and SCHMIDT 1997, BOLTON and OCKENFELS 1997). Nevertheless, most economic research along these lines limits its scope to the question whether social norms act as constraints on rationality. In this paper we aim to go one step further. Given the overwhelming evidence, especially from experimental investigations, that several social norms have a decisive impact on economic behavior (e.g. GÜTH, SCHMITTBERGER, and SCHWARZE 1982, KAHNEMAN, KNETSCH, and THALER 1986, FEHR, KIRCHSTEIGER, and RIEDL 1993, CAMERER and THALER 1995, BERG, DICKHAUT, and MCCABE 1995) we are convinced that it is not enough to compare the influence of norms only to the benchmark of rationality. In addition, one has to increase the effort in analyzing how different social norms relate to each other. This is especially true because in real life a single social norm does not work in isolation but always in a social context (for a discussion of the importance of social context for economic behavior see ORTMANN and GIGERENZER 1997). In this paper we try to find a starting point in this direction by exploring the relation of two predominant social norms: the norm of *fairness* and the norm of *reciprocity*. Our experimental observations leave us quite confident that investigating the interplay of different norms will be very fruitful in describing and predicting economic behavior more soundly.

We explore three treatments (see Table 1) of a one-shot trust game. In a trust game the first player (*Trustor*) is endowed with an amount of money to make an investment while keeping the rest for himself. The second player (*Trustee*) receives a multiple of the investment and may return something to the Trustor. In contrast to all other known reciprocity studies, in which the Trustor and the Trustee have equal property rights, we vary the outcome considered to be fair by different entitlements. In the first treatment (*A*) the Trustor achieves a property right which entitles her to a higher payoff than the Trustee. In the second treatment (*B*) a property right is obtained by the Trustee, but not by the Trustor. As a control treatment (*C*) none of the two players is entitled to more than the other one. Previous to the trust game participants obtain the property rights by *real effort*. In treatment *A* the Trustors have to perform a working task in order to obtain the endowment money while the Trustees enjoy leisure time. In treatment *B* the

Trustees are expected to work. If they accomplish their tasks they are rewarded by a voucher. By handing out a voucher we emphasize that the investment is multiplied only due to the work of the Trustees. In treatment *C* both the Trustors and the Trustees have to work in order to obtain the endowment and the voucher respectively. In the second phase of the experiment the trust game takes place.

TABLE 1

EXPERIMENTAL DESIGN

Entitlement condition	Session	Number of observations	Total
A: Trustors work for the endowment	session 1 session 2	9 8	17
B: Trustees work for the investment being tripled	session 3 session 4	10 10	20
C: Both Trustors and Trustees work	session 5 session 6	8 10	18

The paper is organized as follows. In the second section we review the relevant literature and in section 3 we describe our experimental design. Section 4 motivates and introduces our research hypotheses while section 5 reports results. Section 6 concludes the paper.

II. Fairness, Property Rights, Trust, and Reciprocity

There are two kinds of social norms which have been explored most extensively in economic literature: the norm of fairness and the norm of reciprocity (ELSTER 1989). In the current paper we speak of a norm to be a *fairness norm*[1] if it regulates what is seen as a fair outcome in a bargaining situation.[2] One important variant of the fairness norm is the *equity principle* (SELTEN 1978), which states that an allocation is perceived as fair if the ratio of the outcome to the input of someone is equal to the outcome/input ratio of others.[3] As BURROWS and LOOMES (1994, p. 203) put it: "Differentials in payoffs are deserved, and are therefore fair, if they correlate positively with the amount of effort involved in obtaining them". In most social units

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[1] A whole bunch of economic research is devoted to the notion of fairness. To get an impression of the variety of economic questions where fairness is decisive see KAHNEMAN, KNETSCH, and THALER (1986). Fundamental insights into the influence of fairness considerations on behavior have been obtained by experimentally analyzing the *ultimatum game* (see below), e.g. GÜTH, SCHMITTBERGER, and SCHWARZE (1982), CAMERER and THALER (1995). BOLTON (1991) and FORSYTHE, HOROWITZ, SAVIN, and SEFTON (1994) contrast these findings with observed behavior in *dictator games* (see below) and warn against overestimating the taste for fairness. Several approaches incorporate fairness motivations in theoretical economic models, e.g. FEHR and SCHMIDT (1997), BOLTON and OCKENFELS (1997).

[2] Cf. ELSTER (1989), p. 101.

[3] There exists a massive psychological and sociological literature which confirms the predictions of the equity theory; see e.g. PRITCHARD (1969), WALSTER, BERSCHEID, and WALSTER (1973), GREENBERG (1982).

there is a consensus on what constitutes an equitable relationship although the assessments of the value and relevance of the various participants' inputs and outcomes vary. In industrial settings "manual labor" is seen as the most important input that induces a *property right*,[4] which legitimately entitles to rewards within the guidelines defined by the right. These property rights are enforced by a social norm rather than granted by law.

FREY and BOHNET (1995) analyze institutional effects on fairness and propose a classification of property rights according to the extent to which they become influential in fairness considerations. The two extremes of their scale are on the one hand *property rights defined by luck,* which are supposed to have essentially no influence on a bargaining outcome, and on the other hand *earned property rights,* which cause highest deviations from an equal split.

Indeed, earned property rights seem to be a much more compelling force in order to determine what is considered to be a fair outcome than those property rights which are obtained by accident. HOFFMAN, MCCABE, SHACHAT, and SMITH (1994; hereafter HMSS) find a significant effect of earned property rights in the *dictator game*. In the dictator game one player -the *Allocator*- receives a sum of money from the experimenter which he can unilaterally distribute between another person -the *Recipient*- and himself. If the Allocator is determined randomly between the two persons considerably high amounts - up to 50 percent of the pie - are observed to be given to the other person. The offered amount decreases significantly if the role of the Allocator is *earned* in a competitive quiz.

In their classical paper HOFFMAN and SPITZER (1985) find a similar result in a more strategic situation: in a face-to-face bargaining experiment two players have to divide $14 between themselves. If they cannot reach an agreement one of the players - the *Controller* - receives $12 leaving nothing for the other player. In a first treatment the role of the Controller is awarded by a coin flip. Given the outside option of the Controller, he should not be satisfied with less than $12. But instead a strong tendency towards sharing the $14 equally is observed. In a second treatment both players have to perform a little game of skill in which the winner is rewarded with the role of the Controller. More than two-thirds of the Controllers now obtain at least $12.

Analogously, in studies of the *ultimatum game* the introduction of earned property rights proves to be effective in order to change the outcome which is regarded as fair. In the

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[4] See WALSTER, BERSCHEID, and WALSTER (1973), p. 152.

ultimatum game the *Proposer* has to offer some proportion of a fixed amount of money. The *Responder* either accepts or rejects the offer. If the offer is accepted the money is allocated accordingly. If the Responder rejects nobody receives anything. Common knowledge of full rationality in a setting with merely payoff maximizing players suggests a solution in which the Proposer is supposed to offer one minimum unit which the Responder should accept since one unit is more than nothing. Instead, offers typically average about 30-40 percent of the total, with an equal split often being the mode. Offering less mostly results in the rejection of the offer. HMSS observe that being awarded the role of the Proposer by chance results in much less generous offers than *earning* the role of the Proposer by succeeding in a contest. This result is confirmed even in a high stakes setting (HOFFMAN, MCCABE, and SMITH 1996). Particularly interesting is the fact that the rejection rates remain virtually the same in both settings. Proposers seem to anticipate that Responders are satisfied with much less when the Proposer is entitled.

SMITH (1997) explains this observation with the concept of *mindreading*. According to this concept there is a mental process which enables human beings to infer the reactions of others from the consciousness of their own behavior: "[Mindreading] enables me to see not only the value to me of possessing certain rights to act (property rights), but also to know intuitively the value of such rights for others" (SMITH 1997, p. 20).

In a more recent study RUFFLE (1998) varies the entitlement of the Recipients in the dictator game and the Responders in the ultimatum game. He conducted two treatments of the dictator game and of the ultimatum game respectively. In one treatment Recipients and Responders compete in a skill-testing contest, which determines the size of the available surplus, in the other treatment the surplus is randomly determined. RUFFLE finds that Allocators as well as Proposers offer an amount they view as congruent with the ability shown by their paired Recipients or Responders. Because in almost all entitlement variations Proposers offer more in the ultimatum game than Allocators in the dictator game, RUFFLE concludes that Proposers are able to adapt to their strategic environment. His observation seems to support SMITH's concept of mindreading.

A growing number of investigations outlines the importance of *trust* and *reciprocity* in economic institutions.[5] Reciprocity is understood as a social norm which inclines you to return

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[5] E.g. RABIN (1993), DUFWENBERG and GNEEZY (1996), JACOBSEN and SADRIEH (1996), and ABBINK, IRLENBUSCH, and RENNER (1997).

something (good/bad) for something perceived as (good/bad) you have received. BERG, DICKHAUT, and MCCABE (1995; hereafter BDMC) introduce the two-player, two-stage *investment game*. In the first stage the *Trustor* can invest an arbitrary fraction from an amount of $10. The tripled investment is given to the *Trustee* who has to decide in the second stage whether he would like to send some of this money back to the Trustor. Although the game is played anonymously and only once by each participant, considerably high investments are reported, i.e. Trustors place relatively high trust in the Trustees. Rationality combined with simple money-maximization says that the Trustee has no incentive to return anything. This will be anticipated by the Trustor which implies that neither the Trustor nor the Trustee will send anything. Again rational money-maximization seems to have poor predictive power. Only two of 32 subjects invest zero while five subjects even invest the total amount.[6] In return most of the Trustees reward trust by sending money back. Only six of the 30 Trustees who receive a positive amount return zero. BDMC hypothesize that this result arises from the expectation of some Trustors that the Trustees will behave reciprocal. Indeed, a lot of Trustees obey to the social norm of reciprocity. Similar results are obtained by FEHR, KIRCHSTEIGER, and RIEDL (1993). In their laboratory experiment they find that "firms" who pay more than they have to, are rewarded with voluntary effort contributions by their "workers". FEHR, GÄCHTER, and KIRCHSTEIGER (1997) observe high efficiency gains from trade by introducing reciprocity, i.e. by enlarging the set of actions which are enforceable in contracts.

III. Experimental Design and Procedure: Entitlement in a Trust Game

Table 1 gives an overview of our sessions which were conducted in the Laboratorium für experimentelle Wirtschaftsforschung at the Rheinische Friedrich-Wilhelms-Universität Bonn. Subjects were recruited before the sessions by posters and handbills. Participation was restricted to one session only. Subjects were students of different disciplines, but most of them were law or economics students. Each subject was paid a DM 5 show up fee.

Each session started with the experimenter reading the instruction sheets[7] about the first phase of the experiment aloud. Then each participant drew a card in order to determine her or his role to be Trustor or Trustee. Depending on the treatment, some of the participants - the workers - had to perform a *real effort* working task. In contrast to the studies mentioned

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[6] We refer to the *no history* treatment of BDMC.

[7] A translation of all instruction sheets can be found in the appendix. In order to keep the experiment in neutral terms in the instructions we referred to the roles of the Trustor and the Trustee as Player 1 and Player 2 respectively.

above we did not choose a game of skill or a quiz for entitlement, but *real* work. In our opinion a game of skill or a quiz induces at least two reasons why a person could feel entitled: the reason of performing better than the other (ability) and the reason of having worked (effort). We think that in a labor situation effort is a sufficient determinant of the property right and consequently, of a fair outcome.[8] Since we tried to capture the characteristics of a real labor situation, in our experiment we reduced the competitiveness which prevails in a quiz or in a game of skill. Therefore, as a working task we asked the workers to crack walnuts.[9] In order to succeed they had to come up with at least 150g walnut kernels in half an hour. We told the participants that only a good quality of walnut kernels could be sold in the supermarket and therefore only undamaged half kernels or quarter kernels did count. Excess work was not rewarded.

Before the experiment, we made sure that the participants could easily accomplish the task, if they really concentrated on it. Several workers had to hurry in the last ten minutes, but in the end all workers succeeded. The subjects who did not work enjoyed leisure time while the others were working. For example, they left the laboratory to drink coffee, studied their lecture notes, played cards, or watched the workers. Moreover, we provided them with newspapers and magazines.

While performing the working task subjects were allowed to speak to one another, because at this stage they did not know that a trust game followed in a second phase. In return for the cracked walnut kernels the working Trustors in treatments *A* and *C* received envelopes which contained DM 10 in one-DM-coins. Analogously, the working Trustees in treatments *B* and *C* obtained *tripling vouchers* with the inscription "factor 3"[10]. After all workers had completed

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[8] Several studies show that fairness norms are particularly decisive in the labor market. For an excellent analysis of the importance of fairness in the labor market see SOLOW (1990). According to FREY and BOHNET (1995) "empirical evidence suggests that only a small share of earned income is given away" which underlines the importance of *earned* property rights which are obtained by real effort.

[9] We tried to find a working task which everybody was able to perform without specialization of skill or knowledge. Additionally, we wanted the working task to be sufficiently serious and to make the workers suffer to a certain extent in order to guarantee that they really felt entitled to the endowment (treatment *A*) or the tripled amount (treatment *B*). Furthermore, the not working participants should also have an idea of what kind of work the workers had to perform. Last but not least we chose to let subjects crack walnuts because the experiments were conducted some weeks before Christmas and therefore we could credibly assure that the work created a surplus. Actually, the walnut kernels were indeed sold in a supermarket as ingredients for cookies.

[10] As outlined above we wanted the workers of treatment *A* and treatment *B* to feel entitled to higher payoffs in the subsequent trust game without any doubt. In order to make this very clear to the participants the experimenter returned a money-envelope ([Trustee] a tripling voucher) for the weighed kernels while simultaneously emphasizing the following sentences: "You succeeded in the working task. For this we pay you DM 10. In the subsequent phase of the experiment these DM 10 will become very important." ([Trustee] "You succeeded in

their task and had been rewarded with an envelope or a voucher, the second phase of the experiment started. Again all participants - the workers together with the non-working participants - met in the instruction room. From this point on we asked the participants not to talk to each other. The experimenter handed out an additional instruction sheet which described the trust game and read it aloud.

Our trust game was similar to the investment game introduced by BDMC. In the first stage of the treatment B trust game the Trustor was unconditionally endowed with DM 10, but in treatments A and C the endowment was only provided, if the Trustor succeeded in her working task. In none of the three treatments an endowment was given to the Trustee. [11] The Trustor had to decide how many coins x she wanted to pass to the Trustee, with $0 \leq x \leq 10$. In the second stage of treatment A the Trustee unconditionally received the tripled number of coins sent by the Trustor. In the treatments B and C the Trustee received the tripled amount of coins only if he held a tripling voucher. Note that in treatments B and C at the time when the Trustor made her investment decision she did not know whether the Trustee succeeded in his working task. This would have created a situation of incomplete information for the Trustor in which she would have to estimate the success probability of the Trustee. Because we wanted the trust game to be one of perfect information, we set up the rule that a Trustor got back her original investment if she was matched with a Trustee who did not accomplish his work and as a consequence was not a holder of a tripling voucher. Given this rule, investing did not harm the Trustor if the Trustee was not successful. If the Trustee received a tripled investment he could return an arbitrary amount y to the Trustor on his part, with $0 \leq y \leq 3x$. Trivially, the game is reduced to one stage, if the Trustor passed nothing to the Trustee. In fact, $x = 0$, $y = 0 \ \forall \ x$ is the subgame perfect solution of the trust game, given the players are merely money-maximizers. After the second instruction all participants were seated in cubicles. We increased anonymity by providing a transport-envelope for each subject and marked them with pseudonyms. The transport-envelopes looked equally thick independently of what they contained.

After all Trustors had made their decisions, helpers collected all transport-envelopes containing the money-envelopes with the investments and carried them to the cashroom next door. We

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the working task. For this we reward you with a tripling voucher. In the subsequent phase of the experiment this voucher will become very important.")

[11] In fact, this is the main difference between our game and the investment game conducted by BDMC. This modification was first introduced by JACOBSEN and SADRIEH (1996).

always passed all transport-envelopes, even empty ones. The cashier, who did not know which subject belonged to which envelope, took the money out, recorded the amount sent, and tripled the invested amount. Then he placed the money-envelope in the transport-envelope of a Trustee who was randomly matched with the current Trustor. Only the cashier knew which two pseudonyms belonged to each other. After tripling all investments the transport-envelopes were carried to the cubicles of the Trustees. After they had made their decisions again helpers collected the transport-envelopes and carried them to the cashroom. The cashier again recorded the amounts sent by the Trustees and put the unchanged money-envelopes back in the transport-envelope of the matched Trustors. Then helpers handed over the transport-envelopes to the Trustors who took out the remaining coins.

IV. Research Hypotheses

According to fairness considerations the difference in entitlement should make a difference in payoffs. In the following we speak of a subject holding a strong property right, if (s)he worked more than the participant he is paired with. If we follow the equity principle Trustors deserve the highest payoff in treatment *A*, in which they have a strong property right, and the lowest in treatment *B*, in which they have a weak property right. Analogously Trustees should have the highest payoff in treatment *B*, in which they have a strong property right, and the lowest in treatment *A*, in which they have a weak property right. Because in treatment *C* the property rights of the two players are equal we expect the payoffs of this treatment to lie in between those of the other two treatments. Let $F_{P(\cdot)}(\cdot)$ be the cumulative distribution function of payoffs for each of the three treatments. Then our first two research hypotheses are:

H_1: The stronger the property rights of the Trustors the higher are their payoffs:

$$F_{P(\text{Trustors})}(A) > F_{P(\text{Trustors})}(C) > F_{P(\text{Trustors})}(B)$$

H_2: The stronger the property rights of the Trustees the higher are their payoffs:

$$F_{P(\text{Trustees})}(B) > F_{P(\text{Trustees})}(C) > F_{P(\text{Trustees})}(A)$$

We will test all our hypotheses against the null hypothesis that the distributions are identical. In order to gain deeper insights into what could happen to the payoffs let us have a closer look at the possible behavior of the two subjects in different treatments. How do different property rights effect the behavior in a trust game? From a rational and money-maximizing viewpoint

they should not have any influence at all, since the strategic situation of the trust game remains the same in all treatments. However, given the clear experimental evidence in various games one should obviously not expect that this prediction will be fulfilled. Therefore, in the following we will discuss conceivable consequences of different property rights on trust and reciprocity.

Let us first think about the behavior of the Trustee. If the Trustor has sent nothing there are no actions available for the Trustee. If the Trustee has received money, he faces a situation strategically equivalent to the Allocator in the dictator game. Given the experimentally observed effect of property rights in the dictator game, it is reasonable to assume that the Trustee tends to return more the more the Trustor is entitled. Thus, if the Trustor is entitled, reciprocity and fairness force the action of the Trustee into the same direction, i.e. to return more money. If the Trustee is entitled fairness and reciprocity draw into opposite directions: fairness tends to diminish returns the more the Trustee is entitled. This leads us to our third hypothesis. With $F_{\text{return}}(\cdot)$ we denote the cumulative distribution function of returns on an investment of DM 10 for each of the three treatments[12]:

H_3: The stronger the property rights of the Trustors the higher are the returns (on investment of DM 10): $F_{\text{return}}(A) > F_{\text{return}}(C) > F_{\text{return}}(B)$

Whereas the behavior of the Trustee essentially appears to be predictable, it remains an open question how the Trustor's actions are influenced by varying the property rights. If we apply the concept of *mindreading* proposed by SMITH (1997) the Trustor is supposed to be aware of the behavior of the Trustee. Given the Trustor's beliefs about the Trustee's behavior, it would be profitable for her to invest more the more she is entitled, because - due to fairness - the Trustee will return a higher percentage of the investment he received. Thus, by investing more the more she is entitled, a Trustor can *strategically* takes advantage of the predicted reciprocal behavior of the Trustee.

Although the mindreading concept combined with strategic considerations supports the assumption of higher investments, given higher entitlements of the Trustor, there are good reasons that she will not behave in this way. Instead, we expect that the Trustor tends to invest

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[12] We compare the returns of those pairs in which the Trustor invested DM 10 because besides zero DM 10 is by far the most often occurring investment. Moreover, only the investment of the full endowment is certainly perceived as a "good" action, which is a necessary condition for positive reciprocal behavior.

much less the more she is entitled, since this is the only way for her to unilaterally implement a fair final outcome of the game. Consider for example treatment *A*, in which the Trustor is entitled. Investing a high amount too heavily conflicts with her own fairness considerations, since she is the one who deserves a higher payoff the more she is entitled. Similar reasoning applies to the behavior of the Trustor in treatment *B*. If the Trustor assumes that the Trustee behaves in the manner described, it would pay to invest a low amount, because the Trustee is expected to return only a small percentage. Nevertheless, the fairness norm would prescribe to invest a higher amount since the Trustee is entitled. With $F_{\text{invest}}(\,\cdot\,)$ denoting the cumulative distribution function of investments we have our fourth hypothesis:

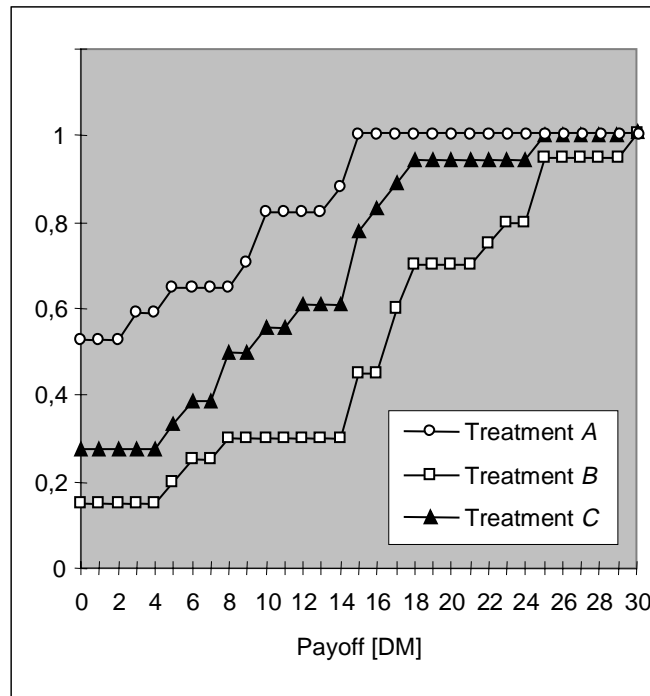H_4: The stronger the property rights of the Trustees the higher are the investments:

$$F_{\text{invest}}(B) > F_{\text{invest}}(C) > F_{\text{invest}}(A)$$

V. Results

Figures 1 and 2 give an overview of the payoffs observed in the experiment by depicting their cumulative distributions.[13]
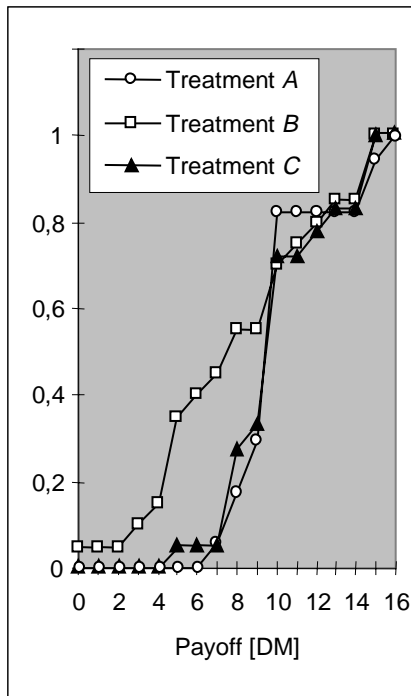
FIGURE 1: CUMULATIVE DISTRIBUTIONS OF TRUSTORS' PAYOFFS

FIGURE 2: CUMULATIVE DISTRIBUTIONS OF TRUSTEES' PAYOFFS

By visual inspection we find that payoffs increase with higher property rights. We test our hypotheses H_1, which claims that the Trustors' payoffs are relatively higher, if their property

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[13] Detailed data tables dealing with decisions and payoffs can be found in the appendix.

rights are relatively stronger, and H_2, which states that the Trustees' payoffs are relatively higher, if their property rights are relatively stronger, against the null hypothesis that the distributions of payoffs are equal in all treatments by applying the Jonckheere nonparametric test for ordered alternatives. We can weakly reject the null hypothesis in favor of the ordered alternative H_1 ($p = 0.0526$). Analogously, we reject the null hypothesis in favor of H_2, which is highly significant ($p = 0.0001$). Pair-wise comparisons of the treatments essentially confirm these results and can be found in the appendix.
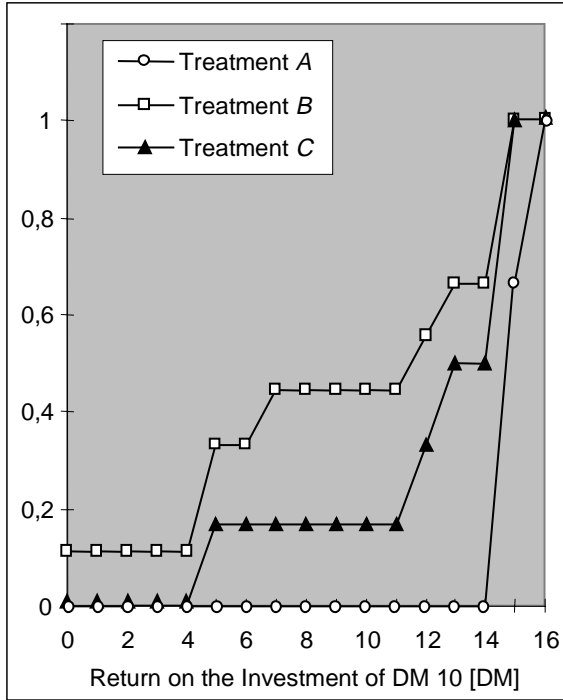

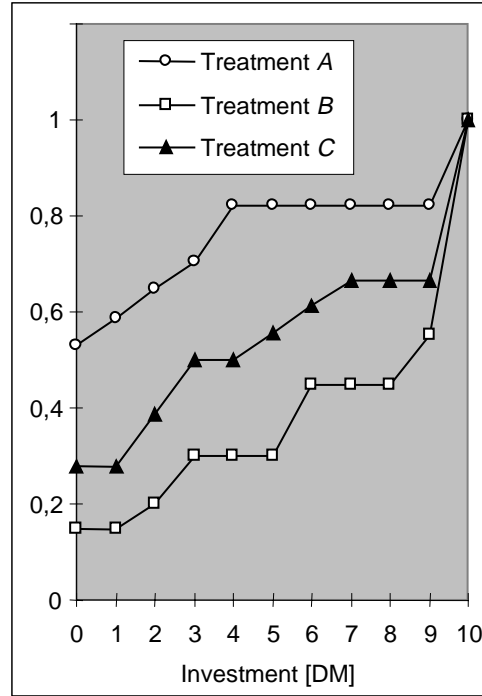FIGURE 3: CUMULATIVE DISTRIBUTIONS OF RETURNS

FIGURE 4: CUMULATIVE DISTRIBUTIONS OF INVESTMENTS

Figures 3 and 4 show the cumulative distributions of the investments and of the returns on investment of DM 10. Again the shown graphs confirm our conjectures. By applying the nonparametric Jonckheere test we can significantly reject the null hypothesis, that the distributions of the considered returns are the same, in favor of our hypothesis H_3 ($p = 0.0179$), which states that the returns (on the investment of DM 10) are relatively higher if the property rights of the Trustors are relatively stronger. Even more clearly the Jonckheere test highly significantly rejects the null hypothesis in favor of our hypotheses H_4 ($p = 0.0026$), which claims that the investments are relatively higher if the property rights of the Trustees are relatively higher. Again, our results are mainly confirmed by pair-wise comparison (see appendix).

VI. Discussion and Conclusion

In the present study we describe three different treatments of a trust game. In one treatment the Trustor is entitled, in a second one the Trustee is entitled and in the third treatment no subject is entitled more than the other one. Subjects do not obtain their property rights by luck. Instead they earn them by investing a real effort in performing a non-competitive working task. In our reciprocity context we find strong support for the influence of the induced entitlement. Final payoffs of both the Trustors and the Trustees tend to increase, if they hold stronger property rights.[14] Thus, our results underline the robustness of entitlement effects found in a number of experimental settings. The observed payoffs reflect an allocation of the outcomes according to the equity principle. This confirms our assumption that in a real effort setting the applied fairness norm is represented by the equity principle and prevails even in a reciprocal exchange. In our opinion this observation is essential because in real life reciprocal behavior is almost always embedded in a social context, e.g. in a labor situation.

We find that Trustees return significantly more the stronger the property right of the Trustor is. Several studies in the literature support the concept of mindreading proposed by SMITH, according to which bargainers are able to foresee the tendency of the reactions of the other subjects. If we apply the mindreading concept to our trust game, the entitled Trustor should expect the Trustee to return more to her than to non entitled Trustors. Thus, we should expect that entitled Trustors will tend to invest more than non entitled Trustors. They should strategically exploit the expected reciprocal behavior of the Trustees. In the experiment we do not observe such a behavior. Instead, Trustors follow the fairness norm by investing more the more the Trustee is entitled. For instance, a small investment in treatment *A*, in which the Trustor is entitled, indicates that the Trustor's behavior is predominantly guided by the fairness norm. Fairness considerations seem to be sufficiently strong to abandon strategic opportunities, which arise from the norm of reciprocity. Therefore, in our setting trust in reciprocity is diminished by the fairness norm. Note that the Trustors' behavior leads to an inefficient outcome because less money is tripled. One possible explanation for the behavior of the trustors in treatment *A* is that the Trustors want to reward themselves for their efforts before playing the trust game with the remaining money representing the endowment.

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[14] The single case in which a pair-wise comparison does not show a significant difference is that of the Trustors' payoffs in the treatments *A* and *C*. This is mainly due to the fact that Trustors in the treatment *A* tend to invest only small amounts which means that a comparatively low surplus is available to be divided between both subjects.

Similarly the Trustor is mainly guided by the fairness norm in treatment *B*, in which the Trustee is entitled. If the Trustor assumes that the Trustee returns relatively modest amounts, it pays for the Trustor to invest little or even nothing. In contrast the fairness norm prescribes investing a relatively high amount, since the Trustee is entitled. Again in treatment *B*, the fairness norm recommends a different tendency of the Trustor's action than the individual optimal action, given a correct estimation of the Trustee's reciprocal behavior. In the experiment we observe relatively high investments. This is in accordance with the fairness norm, rather than with a strategic exploitation of the reciprocity norm. In contrast to treatment *A*, investments according to the fairness norm lead to efficient outcomes in treatment *B*. To summarize, in our setting we find that due to fairness considerations, the Trustors tend to invest more the less the Trustees are expected to reciprocate. We interpret this observation as evidence that the fairness norm is much more decisive than the reciprocity norm.

There is no doubt that much work remains to be done before economists can claim to have provided a general positive theory of social norms. In this paper we start to investigate how the norm of fairness and the norm of reciprocity relate to each other. Although we are aware that the contribution of this paper, regarding the aim of a general theory of social norms, is a modest one, we think that our results strongly encourage further research concerned with the relationship of different norms.

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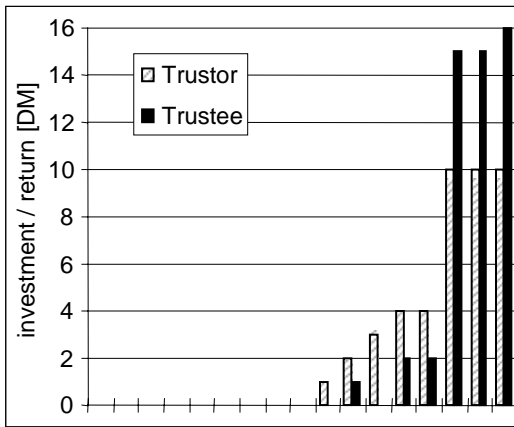## APPENDIX 1

PAIR-WISE DECISIONS IN DIFFERENT TREATMENTS
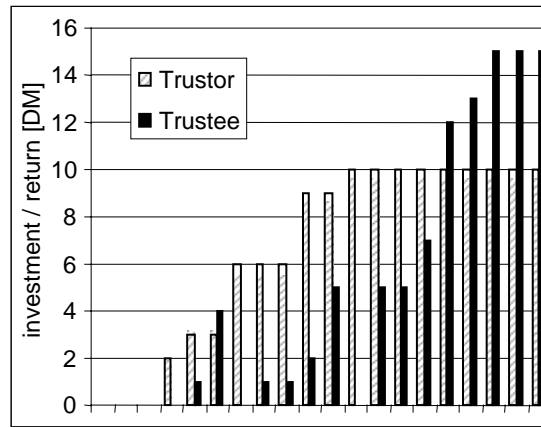

FIGURE A1.1: DECISIONS IN TREATMENT *A*
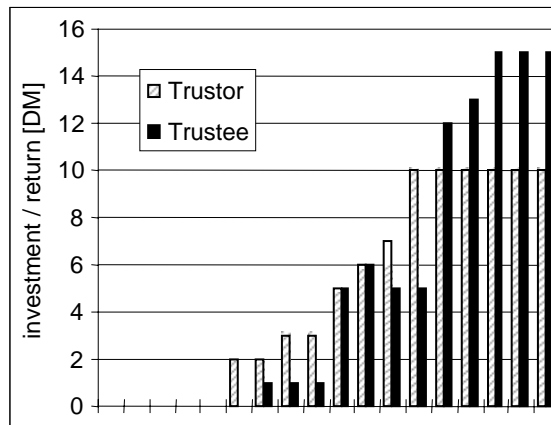

FIGURE A1.2: DECISIONS IN TREATMENT *B*

FIGURE A1.3: DECISIONS IN TREATMENT *C*

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PAIR-WISE PAYOFFS [in DM] (TRUSTOR'S PAYOFF, TRUSTEE'S PAYOFF)

Treatment A		Treatment B		Treatment C	
(7,9)	(10, 0)	(0, 30)	(8, 8)	(5, 25)	(10, 0)
(8, 10)	(10, 0)	(3, 25)	(10, 0)	(8, 6)	(10, 10)
(8, 10)	(10, 0)	(4, 18)	(10, 0)	(8, 8)	(10, 12)
(9, 3)	(10, 0)	(5, 17)	(10, 0)	(8, 8)	(12, 18)
(9, 5)	(15, 15)	(5, 17)	(11, 5)	(8, 16)	(13, 17)
(10, 0)	(15, 15)	(5, 25)	(12, 18)	(9, 5)	(15, 15)
(10, 0)	(16, 14)	(5, 25)	(13, 17)	(10, 0)	(15, 15)
(10, 0)		(6, 22)	(15, 15)	(10, 0)	(15, 15)
(10, 0)		(7, 23)	(15, 15)	(10, 0)	
(10, 0)		(8, 6)	(15, 15)	(10, 0)	

APPENDIX 3

PAIR-WISE COMPARISONS

PAIR-WISE COMPARISONS OF THE PAYOFF DISTRIBUTIONS

Payoffs of Trustors				Payoffs of Trustees			
treatment	A	B	C	treatment	A	B	C
A	-	0.0643	0.4801	A	-	0.0005	0.0329
B		-	0.0681	B		-	0.0222
C			-	C			-

One-tailed Mann-Whitney U-tests with pair-wise comparisons of the distributions of the payoffs observed in different treatments. We test against the null hypothesis that the distributions of payoffs are equal in all treatments. The Table shows the probabilities of observing payoffs at least as extreme as ours.

PAIR-WISE COMPARISONS OF THE RETURN AND INVESTMENT DISTRIBUTIONS

Returns on investment of DM 10				Investments			
treatment	A	B	C	treatment	A	B	C
A	-	0.0318	0.0833	A	-	0.0043	0.0548
B		-	0.2280	B		-	0.1230
C			-	C			-

One-tailed Mann-Whitney U-tests with pair-wise comparisons of the distributions of investment and return given an investment of DM 10. The null hypothesis is that the distributions of investment and return are equal in all treatments. The Table shows the probabilities of observing investments/returns which are at least as extreme as ours.

{Differences in the instructions corresponding to treatment variations are indicated in brackets []. The treatment is shown in boldface. The instructions given to the subjects were written in German.}

Introduction

Your are participating in a two-person game. It will last about 90 minutes. By the draw of a card you will be appointed to the role of Player 1 or Player 2. Please keep your card during the game. Each Player 1 is matched with a Player 2 during this experiment. Nobody knows or will know with whom he is matched. Each player will be paid a DM 5 show-up fee. Other payoffs depend on your success during the experiment.

[*A and C:* After this introduction each Player 1 is asked to sit down in a cubicle. Please put the card with your pseudonym uncovered on the desk.]

[*B and C:* After this introduction each Player 2 is asked to sit down in a cubicle. Please put the card with your pseudonym uncovered on the desk.]

We ask you to do the following job:

The walnuts on your desk have to be cracked.

You should come up with kernels in half or in quarters. Please put the kernels in the bag on your desk.

The kernels will be used as ingredients for Christmas cookies.

[*A and C:* If Player 1 is able to give us a bag with 150g or more walnut kernels in it, we will pay him 10 one-DM coins.]

[*B and C:* If Player 2 is able to give us a bag with 150g or more walnut kernels in it, we will reward him with a tripling voucher.]

[*A:* The DM 10 are important in the following game.]

[*B:* The voucher is important in the following game.]

[*C:* The DM 10 and the voucher are important in the following game.]

You have half an hour to crack the walnuts. If you do the job seriously, you will be able to accomplish the task. Please notice, that we do not count the number of cracked nuts, but weigh the kernel halves and quarters.

[*A:* Players 2 can enjoy leisure time during this half an hour.]

[*B:* Players 1 can enjoy leisure time during this half an hour.]

[*A and B:* They are free to leave the laboratory (e.g. to drink a cup of coffee). But, please be back in time.]

After half an hour, we will tell you how the experiment will continue.

{The following instructions were given to the participants after they finished cracking walnuts.}

The Game

[*A:* The Players 1 worked during the last half an hour. Successful Players 1 were paid 10 one-DM coins, which are contained in an envelope. Unsuccessful Players 1 received an envelope containing a note which says that they were not successful and which has to be send to their matched partners. The successful Players 1 can now

decide to send none, some, or all of the coins in the envelope to their partners. For each coin sent by Player 1 the experimenter will add two one-DM coins. The Players 2 will then decide how much money they want to return to Player 1, while keeping the remaining coins for themselves.]

[**B:** The Players 2 have worked during the last half an hour. Successful Players 2 were rewarded with a tripling voucher. All Players 1 will now be endowed with 10 one-DM coins, which are contained in an envelope. The Players 1 can decide to send none, some, or all of the coins in the envelope to their matched partners. If Player 2 is able to show the tripling voucher, the experimenter will add two one-DM coins for each coin sent by Player 1. The Players 2 will then decide how much money they want to return to Player 1, while keeping the remaining coins for themselves. In the case that the Player 2 has not been successful, i.e. did not receive a tripling voucher, the envelope will be returned with a note saying "No voucher". The sent amount of money is returned unchanged to the Player 1. An unsuccessful Player 2 cannot make any decisions.]

[**C:** All participants worked during the last half an hour. Successful Players 2 were rewarded with a tripling voucher. Successful Players 1 were paid 10 DM, which are contained in an envelope. Unsuccessful Players 1 received an envelope containing a note which says that they were not successful and which has to be sent to their matched partners. The successful Players 1 can now decide to send none, some, or all of the coins in the envelope to their partners. If Player 2 is able to show the tripling voucher, the experimenter will add two one-DM coins for each coin sent by Player 1. The Players 2 will then decide how much money they want to return to Player 1, while keeping the remaining coins for themselves. In the case that the Player 2 has not been successful, i.e. did not receive a tripling voucher, the envelope will be returned with a note saying "No voucher". The sent amount of money is returned unchanged to the Player 1. An unsuccessful Player 2 cannot make any decisions.]

All transactions are anonymous.

The procedure in detail:

[**A and C:** The Players 1 remain seated in their cubicles.]

[**A:** The Players 2 are now asked to take a seat in their cubicles.]

[**B and C:** The Players 2 remain seated in their cubicles.]

[**B:** The Players 1 are now asked to take a seat in their cubicles.]

We ask you not to talk during the experiment.

1. The 10 one-DM coins are contained in a little brown unmarked envelope (*money-envelope*). This envelope is placed in a large envelope (*transport-envelope*) marked with the pseudonym of Player 1. Player 1 decides how many coins to pass to Player 2. To do this, he leaves exactly the amount he wants to send in the envelope. Accordingly, he takes the amount out of the envelope that he wants to pocket. Player 1 is, for example, allowed to keep the whole money or to keep nothing.

The money-envelope must be put back in the transport-envelope. Helpers will then carry the envelopes to the cashroom.

In the cashroom the cashier, who does not know which participant is associated to which pseudonym, takes the money-envelope out of the transport-envelope.

[**A:** The cashier will then triple the money in the money-envelope. The money-envelope is placed in the transport-envelope marked with the pseudonym of the Player 2 who is paired with this Player 1.]

[**B** and **C:** Voucher-case: If Player 2 can show a voucher, the cashier will triple the money in the money-envelope. The money-envelope is placed in the transport-envelope marked with the number of the Player 2 who is paired with this Player 1.

No-voucher-case: If Player 2 has no voucher, a note saying "No voucher" is put into the transport-envelope of Player 1. The amount of money remains unchanged. Player 2 receives his transport-envelope with an empty money-envelope.]

2. The Players 2 receive their transport-envelopes with the money-envelopes containing the tripled amount of money sent by Player 1. The Players 2 in their cubicles then decide how much money to send back to Player 1 and how much money to keep. They leave the amount they want to send back in the money-envelope and pocket the remaining one-DM coins. The money-envelope is put back in the transport-envelope.

The transport envelopes are collected and are carried in the cashroom. The cashier will take the money-envelopes out of the transport-envelopes. He places the money-envelopes containing the unchanged amount of money in the transport-envelopes marked with the pseudonyms of the Players 1.

3. The Players 1 take the money out of the money-envelopes and pocket it.

At the end of the experiment all players will be paid their show up fee in the cashroom.

We give you a sheet of paper for your comments on the experiment, on your own decision, and the decision of your partner.

Thank you for participation.