

## DATA

### Chapter 7 Trust and Fairness in One-Shot Interactions

Before drawing attention on decision strategies for repeated interactions, the goal of *study 1* was to investigate the magnitude of trust, reciprocity, and fairness in one-shot interactions. Although, as I argued, a one-shot situation is an situation that occurs infrequently in everyday life, it is useful for demonstrating a motivation for fairness that directs individuals' behavior. I will report an experiment that was conducted to replicate Berg et al.'s (1995) results. As reported above, in Berg et al.'s study participants in the role of player A invested on average 52% of their endowment and, depending on these investments, participants in the role of player B returned on average 30% of the trebled investment. To investigate the robustness of these findings I conducted an experiment in which the investment game was played with a few modifications namely, concerning the response mode and anonymity. Additionally I investigated the effect of the incentives, which were varied by using doubled payoffs in one experimental condition.

What predictions can be made concerning the behavior of participants in the investment game? Two general motivations individuals may follow can be distinguished: On the one hand, individuals' behavior might be motivated by self-interest. On the other hand, individuals' behavior might be motivated by an interest in fairness. If individuals follow only their self-interested goal of maximizing their monetary payoffs and if they assume that everyone follows this goal then the game-theoretical prediction described in chapter 2 should hold, leading to the following predictions:

Prediction 1.1:           Individuals in the role of player A make no investments.

Prediction 2.1:           Individuals in the role of player B make no returns.

In contrast, if individuals' behavior is caused by a motivation for fair outcomes then participants in the role of player B will return a substantial, "fair" amount of the trebled investment to player A. If one applies the equity principle, described in chapter 3, the payoffs for both participants are regarded as fair if they are equal relative to the contributions of the participants. In an experiment in which the roles of the game are randomly assigned to the players, participants' contributions to the interaction will presumably be regarded as identical. Alternatively individuals could regard the investment of player A as a contribution to the interaction. If a participant does not invest his or her

entire endowment this could be regarded as a low contribution and as a behavior that prevents both players from an efficient outcome. However, if player A invests his or her entire endowment this expresses trust and the contribution to the interaction should be regarded as equal. Therefore according to the equity principle equal final payoffs for both players appear as fair, if player A invests the entire endowment. Accordingly, player B has to return two thirds of the trebled investment so that both players finally obtain equal payoffs. In this case, the equity principle cannot be distinguished from the equality principle (see chapter 3), which predicts equal final payoffs regardless of the contribution.

The behavior of individuals in the role of player A might not be directly influenced by a motivation for fairness, because if player A makes no investment both players end up with their endowments, providing equal payoffs to both of them, which although not efficient can still be regarded as fair. However, if participants in the role of player A anticipate that participants in the role of player B will be motivated by fairness and return a substantial, fair amount, then an investment will increase player A's payoff. Thereby participants in the role of player A will make an investment to increase their payoffs. These deliberations demonstrate that it is necessary to assume that an investment of player A is the result of his or her self-interest; only indirectly does player A's decision take fairness into account. Only player B follows a fairness motive by making substantial returns. However, if fairness—directly or indirectly—plays an important role in the investment game then the following predictions, which are in contradiction to predictions 1.1 and 2.1, follow:

Prediction 1.2:           Individuals in the role of player A make substantial investments.

Prediction 2.2:           Individuals in the role of player B make substantial returns if the other player invests the entire endowment.

What is the role of reciprocity in the investment game? Reciprocity should influence individuals in the role of player B. If a high investment is made reciprocity predicts that individuals in the role of player B reciprocate the trusting decision of player A with a large return. In a broader sense reciprocity also includes negative reciprocity, such that selfish, unkind behavior of another person is punished. It could be argued that a low investment of player A is regarded as unkind behavior. If a low investment is regarded as a small contribution to the interaction it provides an opportunity to differentiate between the equity and equality principle. If player A makes only a small contribution to the interaction, in

contrast to player B who is willing to establish a cooperative interaction, then according to the equity principle a higher final payoff for player B compared to player A is fair. In contrast, the equality principle implies that individuals strive for equal payoffs regardless of the individuals' contributions; therefore participants in the role of player B following this principle will always choose a constant return rate of two thirds for obtaining equal final payoffs. These deliberations demonstrate that in the investment game the equity principle might be closely tied with positive and negative reciprocal behavior, as it formulates the behavior of a reciprocal individual. If reciprocity has no substantial effect on individuals' behavior in the role of player B prediction 3.1 should hold. In contrast, if individuals are motivated to behave reciprocally then prediction 3.2 follows:

Prediction 3.1:       The return rate does not depend on the investment rate.

Prediction 3.2:       The return rate is positively correlated with the investment rate.

What effect does the amount of money with which the game is played have on individuals' behavior? From a game-theoretical perspective it makes no difference whether the players make decisions regarding small or large amounts of money. Likewise if participants are motivated by fairness the amount of money should not influence which payoff distribution is regarded as fair. For instance, if an individual regards equal final payoffs as a fair outcome it should not make any difference whether these payoffs are \$10 or DM10. However, if the payoffs are increased the incentives in the game become more salient and participants might be motivated to give their decisions more thought. Likewise Smith and Walker (1993) argue in their review that when payoffs in an experiment are increased a shift in the direction of the game-theoretical prediction can often be observed. Additionally higher incentives reduce the variance of behavior.

If only low incentives are provided the endowment itself might not be sufficient to fulfill the expectations the participants in the role of player A have about how much money they would make by their participation in the experiment. Therefore an investment appears as the only possibility to reach a payoff that fulfills the expectations. In contrast, if high payoffs are provided the expectations are already reached by the endowment and the loss of the endowment will be regarded as worse compared to a situation with low incentives.

Participants in the role of player B might struggle whether they should behave selfishly by keeping the entire investment or fairly by returning a substantial amount. If only low incentives are provided a selfish decision might appear as not worthwhile because

it causes distress as an unfair behavior, which would not be outweighed by the small amount of money the individual would gain. Therefore an individual might renounce a high payoff and make a substantial return, thus avoiding a bad conscience by making no return.

It follows that higher incentives should move behavior in the direction of the game-theoretical prediction as expressed in prediction 4.1. In contrast, a game-theoretical analysis makes no difference between high and low incentives so that the behavior should not differ, as expressed in prediction 4.2.

Prediction 4.1: In a condition with high incentives participants will on average make lower investments and lower returns compared to a condition with low incentives.

Prediction 4.2: The average investment and return rates do not differ between conditions of high versus low incentives.

### *7.1 Method*

In the experiment 40 women and 40 men participated. Their average age was 24 and they were mainly students of different departments of the Free University of Berlin. The experiment was conducted with a between-subject factor incentives with two levels. In the first low-incentive condition participants in the role of player A (player B) could make a maximum payoff of DM 15 (DM 20), whereas in the high incentive condition participants in the role of player A (player B) could make a maximum payoff of DM 30 (DM 40). The experiment lasted on average 20-30 minutes.

Instead of providing participants with real money, which they could send to each other, participants had to fill out a decision sheet and depending on their decisions corresponding real payoffs were paid to the participants at the end of the experiment. Additionally, the experiment was not conducted with a “double blind” method.<sup>5</sup> Only anonymity concerning the relationship between the participants was provided. The decisions and the obtained payoffs were known to the experimenter.

Upon arriving participants were given the instructions. These explained that each participant would be paired with another person who would not be present in the room where the participant sits. The participants were told they would not be informed who the

<sup>5</sup> A double blind method ensures, besides guaranteeing anonymity between the participants, that the experimenter has no possibility of detecting which decision has been made by a particular participant. In Berg et al.'s (1995) study this was done by letting the participants send and return their money by means of mailboxes and the assignments of the participants to particular mailboxes were unknown to the experimenter.

other person is and likewise the other person would not be told their identity either. They were then told that both participants would receive an endowment of DM 10. The participant in the role of player A could send any amount to player B, which would then be multiplied by 3. The participant in the role of player B would decide how much he or she wanted to return. For illustration, three examples were provided in which player A (B) sends (returns) different amounts. In the high- (low-) incentive condition they were then told that the obtained payoff (50% of the obtained payoff) would be paid for their participation in the experiment.

Before participants made their decisions another example was presented to them on a separate page and the participants had to answer which payoff would result. This was done to check whether all participants had correctly understood the instructions. At the end of the experiment before determining the payoffs the experimenter verified that the questions were answered correctly. If not, which was the case for 4 of 80 participants, any misunderstandings were clarified and the participants could change their decisions if they liked to do so.

Finally the participants had to make their decisions. Participants in the role of player A had to decide how much of their endowment of DM 10 they wanted to invest. For the participants in the role of player B the strategy method was used (for the strategy method see Brandts & Charness, 2000). The participants had to make a decision for all possible amounts player A could have sent to player B (for the full instructions and the decision sheet see appendix A).

To increase anonymity participants were paired with another person who was not present in the laboratory at the same time. After the decision had been made the experimenter looked up the decisions of the participant and of the participants in the other player role and corresponding payoffs were determined and paid.

## *7.2 Results*

The average investment rate turned out to be 80% ( $SD=22\%$ ), thereby providing strong support for prediction 1.2 that substantial investments are made. Figure 5 shows the frequency distribution of investments and illustrates that most participants invested their entire endowment.

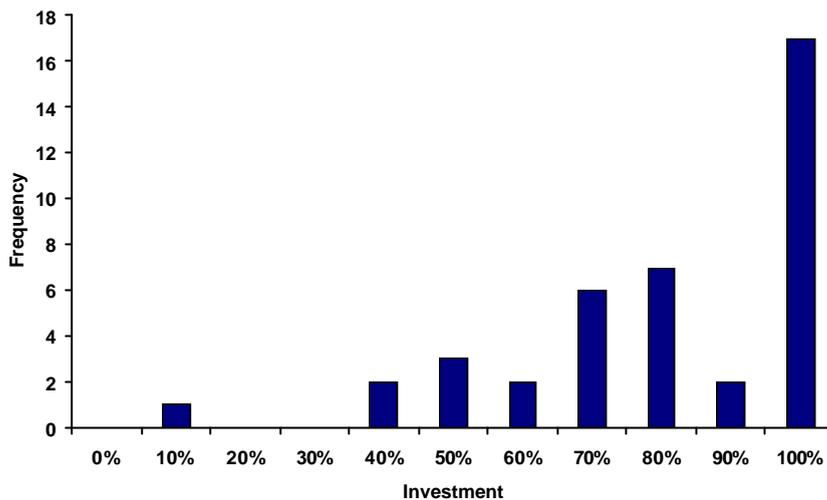


Figure 5. Frequency distribution of investments.

For testing predictions 2 only the return rates in the case of an investment of 100% by player A were considered. For this case participants in the role of player B decided to return on average 54% ( $SD=20\%$ ) of the trebled investment. This result provides strong support for prediction 2.2, which asserts that individuals make substantial returns if high investments are made. Figure 6 shows the frequency distribution of the return rates in the case of an investment of 100%. The figure clearly demonstrates that the most frequent return rate ( $n=21$ ) was 67%, consistent with the equity principle.

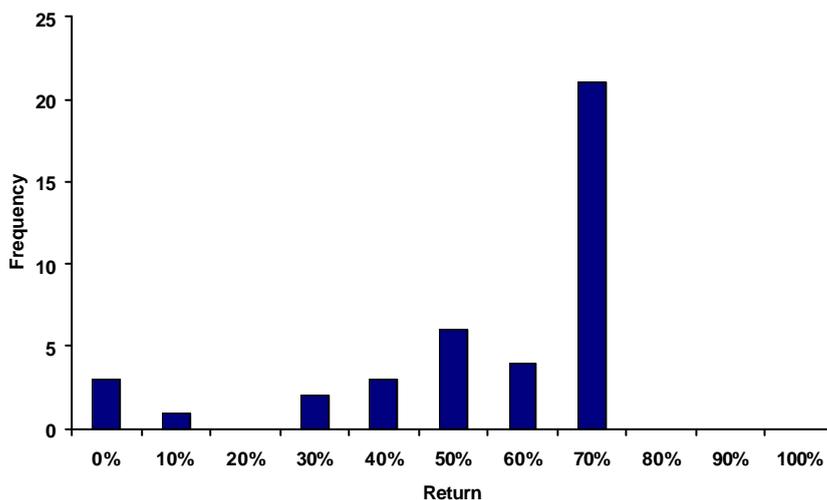


Figure 6. Frequency distribution of return rates.

The most frequent return rate of 70% is actually a return rate of 66.7% rounded to 70%.

Predictions 3 addresses positive and negative reciprocity. If prediction 3.2 holds then the return rates should increase with the investment rates. For testing predictions 3 first for every participant the correlations between the chosen return rates and the 10 possible investment rates were determined. Thereafter the average correlations across all participants were calculated. These turned out to be rather low with a value of  $r=.10$  ( $t_{39}=1.3$ ,  $SD=0.48$ ,  $p=.211$ ; small effect size according to Cohen, 1988) thereby providing support for prediction 3.1 that the return rate does not depend on the investment rate.

Finally a potential effect of the different incentive conditions was analyzed. The average investment in the low-incentive condition of 86% ( $SD=18\%$ ) was much higher than the average of 74% ( $SD=25\%$ ) invested in the high-incentive condition ( $t_{38}=1.8$ ,  $p=.087$ ; medium effect size  $d=0.62$  according to Cohen, 1988). Likewise the average return rate of 55% ( $SD=17\%$ ) in the low-incentive condition was higher compared to the high-incentive condition in which on average 48% ( $SD=18\%$ ) was returned ( $t_{38}=1.3$ ,  $p=.186$ ; medium effect size  $d=0.44$ ). The results support prediction 4.1: high incentives do effect individuals' behavior in the direction of the game-theoretical prediction.

### 7.3 Discussion

The experiment clearly illustrates that individuals deviate from the game-theoretical prediction by making substantial investments and returns. Only 3 of the 80 participants made a decision consistent with the game-theoretical prediction. Thereby Berg et al.'s (1995) findings are replicated. However, in comparison to their study the amount of investments and returns turned out to be higher in the present study. This difference could be due to the modifications to how the present experiment was conducted. Providing participants with real money as in Berg et al.'s study, which participants have to send or return, might make the payoffs more salient to the participants and thereby might induce an endowment effect (Thaler, 1980). Participants might be less willing to invest and return money they already have received, compared to the situation of the present study in which participants made decisions about hypothetical money, which was paid later. Additionally the absence of anonymity in respect to the experimenter might also influence behavior, in that individuals might not want to appear very selfish and uncooperative to the experimenter and therefore make substantial investments and returns. Additionally the low incentives in one experimental condition also increased the investments and return rates, as has clearly been demonstrated by the comparison with the high-incentive condition.

As predicted by the equity principle the predominant return rate turned out to be two thirds so that the two participants in the experiment ended up with equal final payoffs. However the return rate did not depend on the investment rate. The average correlation between the investment rate and the return rate was quite small. As reported above, the average correlation between the investment and return rate was  $r=.02$  in Berg et al's (1995) study. This result shows that positive and negative reciprocity did not turn out to be very distinct in the one-shot experiment. One could argue that participants make substantial and fair returns even if participants in the role of player A make low investments, because they might not interpret a low investment as an unkind, uncooperative decision; rather, they might interpret it as a precautionary decision. I suppose that negative and positive reciprocity has to be developed in a repeated interaction, in which the decision can be more easily interpreted.

Finally, the results show that although individuals deviate from the game-theoretical prediction, that is, build on the assumption of purely self-interested individuals, there are several modifications that can shift behavior towards the game-theoretical prediction by, for instance, providing high incentives. Another condition that has not been touched in the present study is experience with one-shot situations. As I have argued, a one-shot game is a situation with which individuals might not be familiar. If individuals play a one-shot game repeatedly with different opponents under anonymous conditions they might move to the game-theoretical prediction in later games. However, instead of proceeding with an artificial situation and letting individuals obtain experience with such, I will proceed with studying a more realistic situation with which individuals are already experienced—an indefinitely repeated game.