Universität Passau
Wirtschaftswissenschaftliche Fakultät
Lehrstuhl für Volkswirtschaftslehre mit Schwerpunkt Wirtschaftstheorie
Prof. Dr. Johann Graf Lambsdorff

Trust and the Threat of Termination: An Experimental Study on the Effect of Termination Rights on Cooperative Behaviour in Repeated Trust Games

Seminararbeit für das Masterseminar
„Experimental Economics"

Sommersemester 2015

Marvin Hanisch

Matrikelnummer:	57283
Fachsemester:	4
Studiengang:	M.A. International Economics and Business
Anschrift:	Hochstraße 9 in 94032 Passau
E-Mail-Adresse:	marvin.hanisch@uni-passau.de
Abgabetermin:	31.07.2015
Betreuer:	Susanna Grundmann und Katharina Werner

TRUST AND THE THREAT OF TERMINATION:
AN EXPERIMENTAL STUDY ON THE EFFECT OF TERMINATION RIGHTS ON COOPERATIVE BEHAVIOUR IN REPEATED TRUST GAMES

Marvin Hanisch
University of Passau

ABSTRACT

This laboratory experiment studies the influence of termination rights on a repeated trust game. In contrast to previous studies, termination is not a predetermined event but a right that is allocated to one or both players. According to the prevailing economic theory, termination rights discourage opportunistic behaviour. Hence, if trustors anticipate higher congruity, they would invest more, making both players better off. However, our results suggest that termination provisions improve trustworthiness but have little influence on the level of trust.

KEYWORDS: contracting, incomplete contracts, laboratory experiment, termination, trust, trust game, trustworthiness

ACKNOWLEDGEMENTS: I am indebted to my colleagues Marcus Antonio Giamattei, Susanna Grundmann, and Katharina Werner for taking the time for regular discussions on the topic and their unfailing support. Moreover, I thank Peter Rhomberg and Carina Hausladen for the great teamwork throughout the project. Last but not least, I would especially like to thank the voluntary participants for taking part in the experiment.

Table of Contents

1 Introduction 3

2 Experimental Design and Treatments 3

3 Literature Review and Hypotheses 5

4 Procedures 7

4.1 Laboratory Set-Up 7

4.2 Sample 7

5 Results 8

5.1 Summary Statistics 8

5.2 Statistical Interpretation 9

6 Conclusion 23

References 24

Appendix: Instructions 26

1 Introduction

Whenever individuals collaborate, there is a latent hazard that one party behaves opportunistically. Signing a contract is at typical means to mitigate this risk. Given that contracts remain largely incomplete due to the impossibility of foreseeing all contingencies (Tirole 1999), they often include termination rights allowing one or both parties to end the collaboration prematurely (Serapio, Manuel G. Jr. and Cascio 1996; Ariño et al. 2014; Hadfield 1990; Arruñada, Garicano, and Vázquez 2001). Although the literature agrees that termination provisions reduce opportunistic tendencies (Stiglitz and Weiss 1983; Klein 1980), there is a lack of empirical evidence to support this argument. A controlled experiment is a convenient method to separate the effect termination rights from other confounding factors. Thereby, I attempt to answer the question of how the allocation of termination rights to the partners affects collaborative behaviour.

In a simplified form, a repeated trust game bears many resemblances to the principal-agent dilemma of collaborations. Mirroring the problems of incomplete contracts and opportunistic behaviour, the principal in the role of the trustor cannot enforce compliance of the agent (trustee). Conversely, in case of unsatisfactory collaboration outcomes, the relationship can be terminated. Our design differs from earlier research in two important ways. First, whereas in most studies with iterated games, termination is exogenous, we let the subjects decide when to end the game. Secondly, unlike in games with outside options, the amount that subjects receive after termination is dynamic and depends on the previous rounds.

2 Experimental Design and Treatments

The experimental design builds on a trust game (Berg, Dickhaut, and McCabe 1995).[1] We adapt the classic design in three ways. First, the same game is played repeatedly for 10 periods in the same constellation because trust typically builds over time and repeated interactions (Das 2004). Second, the trustor needs to transfer a minimum amount of 5 units per round, which represents the specificity of the relationship. Third, we introduce a termination right that allows the players to end the game in a period of their choice. Receiving

[1] In the trust game, a trustor transfers a percentage of her initial endowment to a trustee, which is multiplied by a given factor x. The trustee can then decide whether to return money to the trustor. The amount given to the trustee is interpreted as the investor's general trust level whereas the sum returned to the investor measures the level of trustworthiness Camerer (2003: 85).

a termination right effectively means a better bargaining position for the trustor vis-à-vis the trustee.

Baseline (BL)

In the style of the original trust game, the trustor and the trustee have an endowment of 10 units per round. The multiplication factor for the sum transferred by the trustor is 2. This factor can be seen as the value generation triggered by the investment. In a repeated trust game over 10 rounds with a minimum amount invested of 5 units, the payoff structure for the trustor is

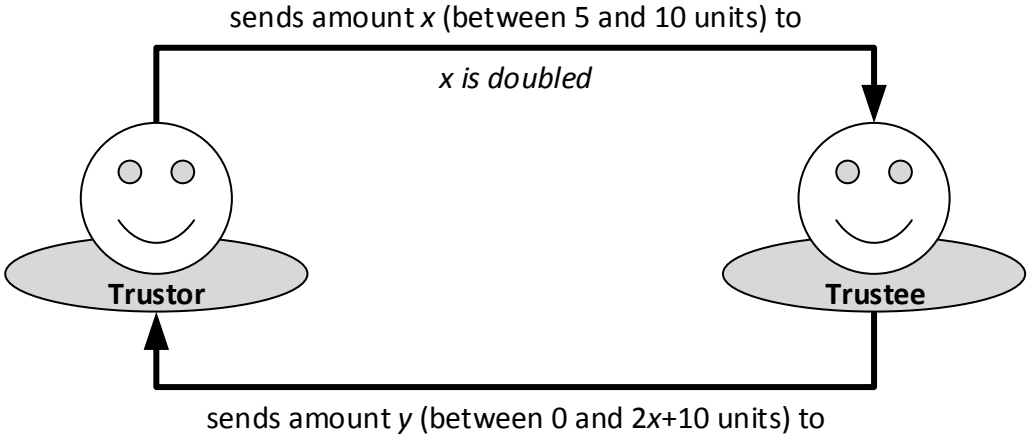
$$p_{trustor} = 100 - \sum_{i=1}^{10} x_i + \sum_{i=1}^{10} y_i$$

and for the trustee it is

$$p_{trustee} = 100 + 2\sum_{i=1}^{10} x_i - \sum_{i=1}^{10} y_i$$

where $x_i \in [5; 10]$ is the sum the trustor transfers in period i and $y_i \in [0; 30]$ is the amount the trustee returns in period i.

Figure 1: Schematic Representation of Baseline for One Period



The game theoretic solution can be derived via backward induction (Lyons and Mehta 1997). In order to maximize their payoffs, the trustees would transfer nothing to the trustors who in turn anticipate this move and transfer only the minimum transfer rate of 5 units per round yielding a final payoff of 50 units for the trustors and 200 for the trustees. Consequently, we would arrive at a Pareto-inefficient solution due to a lack of trust.

Treatment 1 (T1): Allocation of the Termination Right to the Trustor

In treatment 1, the trustors have a termination right that allows them to end the game before any of the ten rounds. The trustee knows that the trustor can terminate the game prematurely. In case of termination, the payoff of the last completed round is paid out. By comparing the amounts transferred in treatment 1 to the baseline, we can assess how the availability of termination rights affects collaborative behaviour. If both players behave rationally, the trustor anticipates the trustee's defection and terminates the game in the first round. Both, the trustor and the trustee, obtain 100 units each after 10 rounds.

Treatment 2 (T2): Allocation of Termination Rights to the Trustor and the Trustee

In treatment 2, both players obtain the possibility to the end the game prematurely. Each player knows that the other party may end the game at will. The Nash equilibrium does not differ from the first treatment because the trustor will use the first chance to end the game. For the trustees, it would be irrational to terminate early because they would always be better off sending back nothing to the trustors. Therefore, any differences between treatment 1 and treatment 2 may be ascribed to the additional termination right.

3 Literature Review and Hypotheses

A commonly held view in the economic literature is that "[t]ermination rights and the associated damages act to reinforce cooperative behaviour" (Hagedoorn and Hesen 2007: 347). In the context of repeated transactions, the mere threat of termination together with the existence of a flow of quasi-rents may be sufficient to assure performance (Klein and Leffler 1981). As such, it can serve as an effective means to prevent opportunistic behaviour. Therefore, a

> transactor will not cheat if the expected present discounted value of quasi rents he is earning from a relationship is greater than the immediate hold-up wealth gain. The capital loss that can be imposed on the potential cheater by the withdrawal of expected future business is then sufficient to deter cheating. (Klein 1980: 358)

In other words, "the threat of termination encourages behavior that the principal (employer, landlord, bank) finds desirable" (Stiglitz and Weiss 1983: 912). Transferring this logic to the trust game, the termination right should be allocated to the trustor in order to incentivize the trustee to play collaboratively (Weber, Mayer, and Macher 2011).

This argument is further supported by an experiment conducted by Schuessler (1989) that bears some resemblances to our design. Whereas termination in repeated games is typically exogenous (Normann and Wallace 2012; Zwick, Rapoport, and Howard 1992), he allows for endogenous termination. In a repeated prisoner dilemma, subjects can exit at the end of any round and switch to a new partner without cost. His findings suggest that the threat of voluntary termination promotes cooperation. This is in line with theoretical arguments that termination provisions are essential for self-enforcing agreements (Parkhe 1993). Based on these arguments from the literature, we can formulate our first hypothesis.

H1: The return ratios in treatment 1 and treatment 2 are higher than in the baseline.

The argument can be extended further to include the trustor as well. Reciprocal behaviour but also the communication of trustworthiness (e.g. through higher return ratios) favours cooperation (Boero et al. 2009; Bourgeois-Gironde and Corcos 2011). If the trustee behaves less opportunistically, the trustor has an incentive to invest more (Jap and Anderson 2003). As a result, the sending ratio should be higher in treatment 1 and 2 as compared to the baseline.

H2: The sending ratios in treatment 1 and treatment 2 are higher than in the baseline.

From a game a game-theoretic perspective, treatment 1 is the same as treatment 2. If the trustees maximize their profits, using the termination right has no economic advantage. They would always fare better by simply reducing the transfer rate to zero, a possibility that trustors do not have.

H3: Transfer ratios do not differ between treatment 1 and treatment 2.

The possibility to end a repeated interaction as a response to defection has been referred to as "self-serving punishment" (Cant and Johnstone 2006). Although both players may be worse off in this strategic scenario, the termination option spares the player the humiliation of further exploitation. Hence, the likelihood of termination should increase if the trustors incur losses repeatedly.

H4: Repeated losses for trustors increase the likelihood of early termination.

4 Procedures

4.1 Laboratory Set-Up

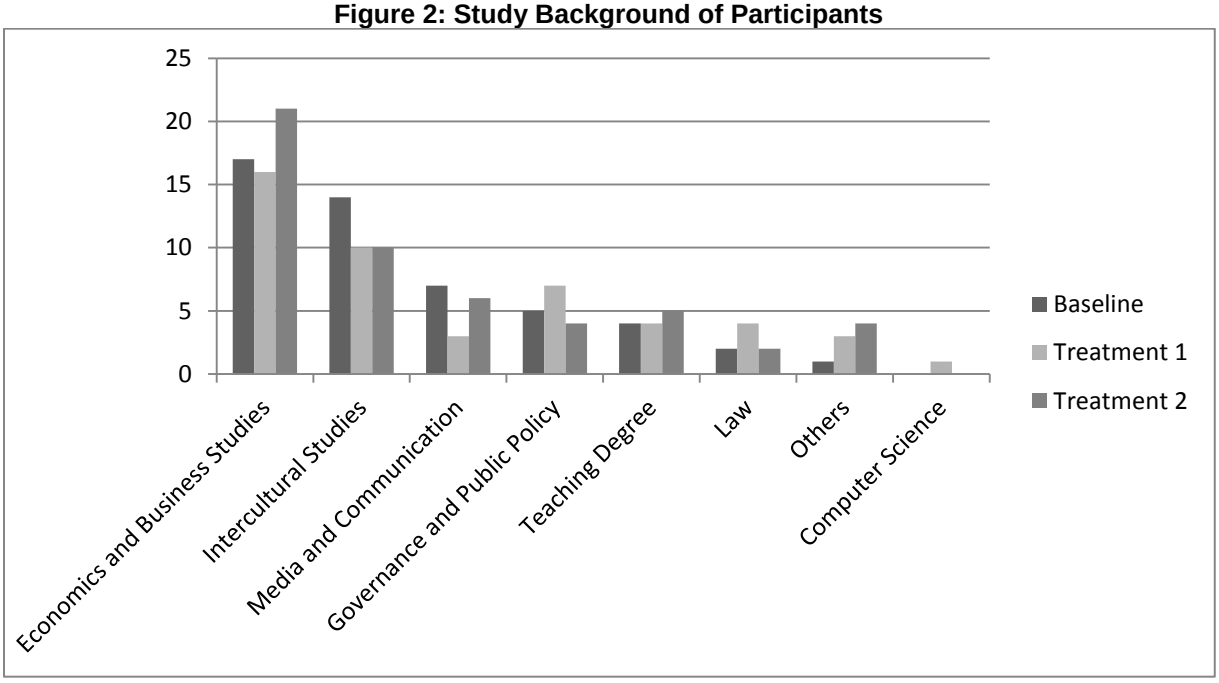
For the present study, we apply the broadly accepted standards for economic laboratory experiments. To ensure double blindness (Hoffman et al. 1994), the experiment was conducted in one of the computer laboratories at the University of Passau where the participants were separated from each other through boxes and the experimenter was ignorant of the individuals' choices. To make meaningful causal inferences, we randomly allocated the roles of trustors and trustees as well as the treatments to the participants in each session. Moreover, we opted for a between-subject design so that a participant's decision was not influenced by previous treatments. We used the z-Tree software for programming the experiment (Fischbacher 2007).

4.2 Sample

Subjects were recruited from students at the University of Passau. We advertised the experiment in different courses, posted bills and announced it via social media platforms as well as the university's website. In spite of this, it turned out that the most effective way was engaging spontaneous passers-by between the lectures.

Altogether 150 subjects participated in the experiment which was run from June 16 to June 19. Thus, 50 observations in pairs were gathered for the baseline, and 48 and 52 for treatment 1 and treatment 2, respectively. The participants come from different disciplines. The largest group has a business or economics background (36%), followed by intercultural studies (22.7%), and governance and public policy (10.7%). The average age is 22.5 years, 35.3% of the subjects are male and 64.7% are female. Most importantly, there is no statistically significant difference between the groups along the dimensions age and gender at the 1 percent level using a Kolmogorov-Smirnov distribution test. Although there are significant differences for certain fields of studies, the distribution is relatively similar across treatments indicating that randomization was effective (*cf.* Figure 2).

Figure 2: Study Background of Participants



Upon entering the computer lab, each participant drew a random seat number that determined the treatment and role. Before starting the experiment, the experimenter explained the general procedure. Subsequently, the subjects individually read the written instructions of the game on their screens illustrated by a simple graphic (*cf*. Figure 1). In case of questions, they could approach the experimenter in the lab. Each participant anonymously played with another person in the room and the constellation was maintained throughout the game. Each session lasted for approximately 20 minutes. At the end of the experiments, the participants received free snacks and drinks as recognition for their time. One slight irregularity concerns the first session where the experimenter briefly left his box. However, the transfers in that session do not show any significant differences from other sessions.

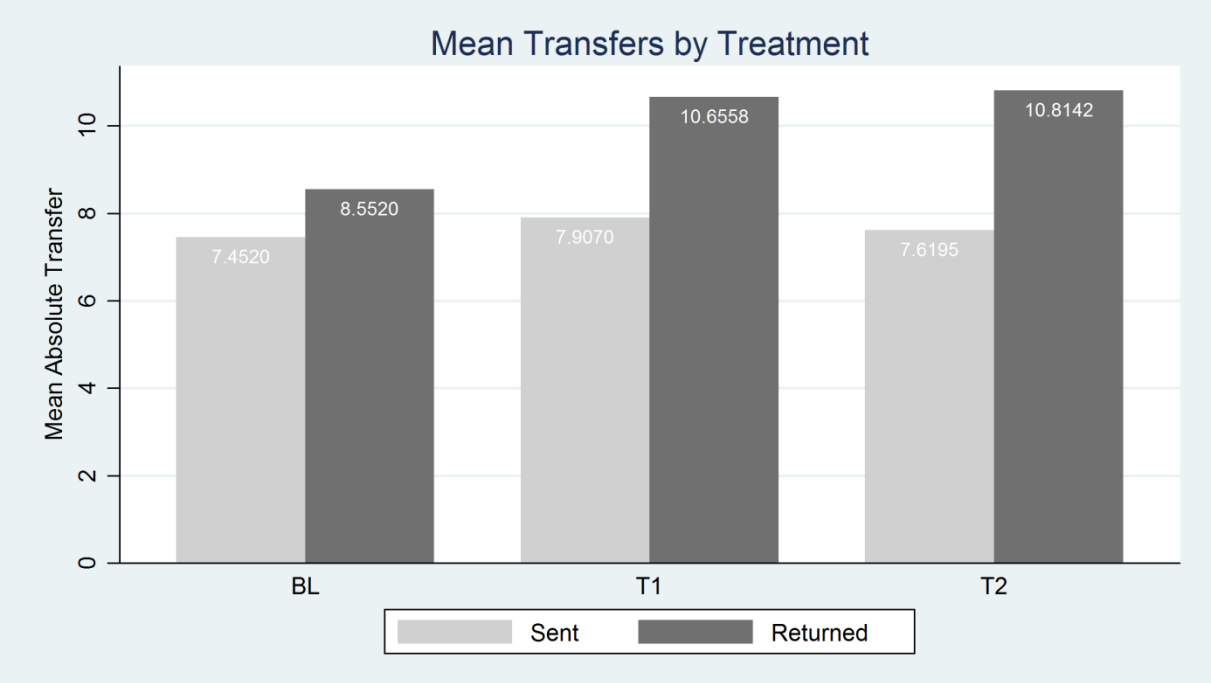
5 Results

5.1 Summary Statistics

Comparing the average absolute transfers, we see that the right to terminate affects above all the amount returned but not the amount invested (*cf*. Figure 3). The differences in the amount invested are only significant between the baseline and treatment 1 (*cf*. Table 1). In treatment 1, the average amount returned is 24.6% higher than in the baseline. For treatment 2, the rise is slightly higher with 26.5%. The right to terminate was used rather

frequently in both treatments. Roughly 30% of the games in the treatments ended prematurely. Table 1 summarizes the results.

Figure 3: Mean Transfers by Treatments



5.2 Statistical Interpretation

This section describes the results of three major analyses. The first subsection shows the average payoffs and transfers across the treatments for each period. Here we also discuss the congruity of the results with hypotheses 1 to 3. Next, we scrutinize what drives subjects to make use of the termination option and link the findings to hypothesis 4. The third part looks into strategy choices. As an additional analysis, we examine path dependencies in order to answer the question whether higher levels of trustworthiness actually lead to higher investments.

Table 1: Summary Statistics

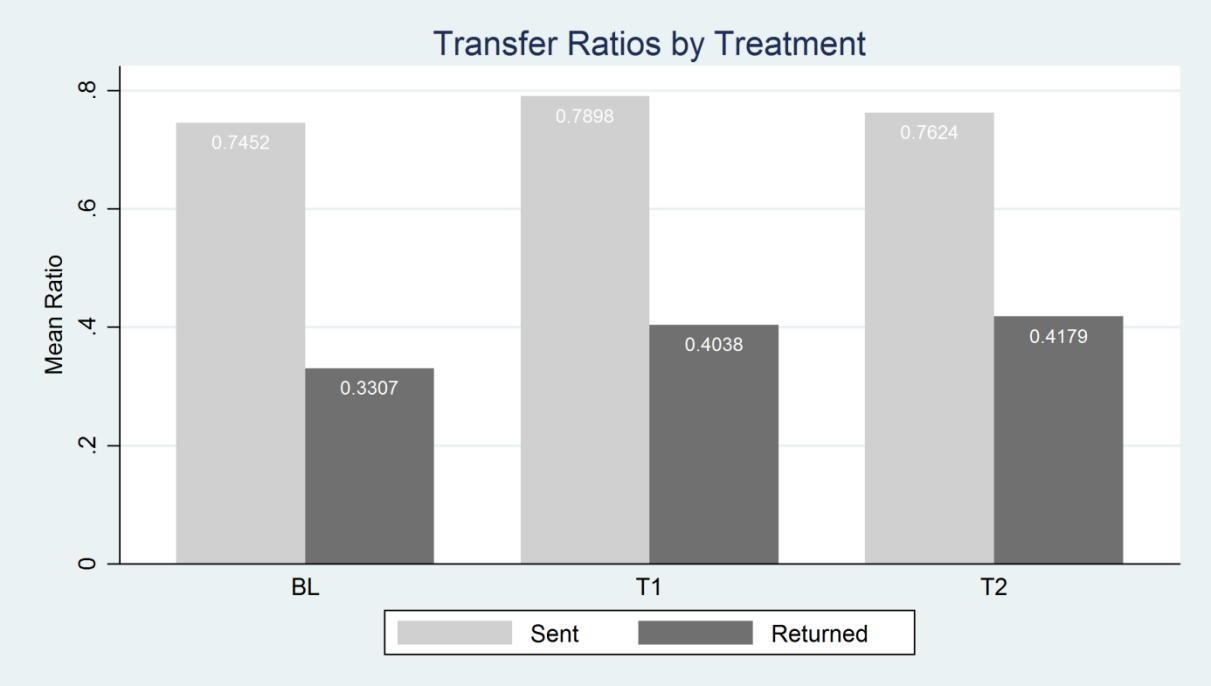
	Baseline (BL)			Treatment 1 (T1)			Treatment 2 (T2)			First Differences		
Variable	*N*	Mean	STD	*N*	Mean	STD	*N*	Mean	STD	BL-T1	BL-T2	T1-T2
amount invested	25	7.452	1.086	24	7.907	1.296	26	7.619	1.278	-0.455 *	-0.167	0.288
										(-2.35)	(-0.88)	(1.43)
amount returned	25	8.552	3.585	24	10.656	2.244	26	10.814	4.371	-2.104 ***	-2.262 ***	-0.158
										(-4.36)	(-4.13)	(-0.31)
termination trustor				14	0.2917		16	0.3077				
termination trustee							0	0				
period of termination				14	7.43	3.101	16	6.75	2.315			

t statistics in parentheses (Student's t-test with unequal variance)
* p<0.05, ** p<0.01, *** p<0.001

Transfer Ratios across Periods

Generally speaking, the results in the baseline are similar to the findings by Johnson and Mislin (2011) who analyse 161 replications of the trust game. Considering that trustors were only able to send an amount between 5 and 10 units, our relative sending ratio of 0.49 in the baseline is fairly close to the 0.5 in the meta study. Similarly, the ratio of the amount returned is 0.33 as compared to 0.37 in Johnson and Mislin (2011). Figure 4 shows the average transfer ratios per treatment.

Figure 4: Total Transfer Ratios



Breaking the results down by period, the average investment ratios are similar in the treatments (*cf.* Figure 5). One exception is period 6 in treatment 1 which is indeed the only statistically significant deviation from the baseline (*cf.* Table 2). The peaks in period 3 and 6 can be interpreted as a direct response to the above average return ratios in the preceding periods. The pattern will be analysed statistically later on.

On the subject of trustees' behaviour, Figure 6 shows that the return ratios in the treatments exceed those in the baseline for all periods except the last one. The differences are significant at the 5% level or lower in periods 2, 4, 5 and 9 for treatment 1. Treatment 2 bridges the gaps with significant differences to the baseline for periods 4, 6, 7 and 8 (*cf.* Table 3). Treatment 1 and treatment 2 only differ significantly in period 2.

Another effect can be observed in the last periods. Apparently, trustors cannot anticipate that the trustees have no incentive to maintain high return ratios in the last period. Consequently, trustors even increase the amount invested just to be deceived.

All in all, the results support hypothesis 1. Opportunistic behaviour is moderated by the treatments and therefore trustees increase their return ratios. In addition, as predicted by hypothesis 3, there seems to be no difference between the treatments. In contrast, the treatments have little influence on the investment ratios which would entail a rejection of hypothesis 2. However, it might be that the limited scope of decision-making for the trustor in our setting obscures real differences in the amount sent.

Figure 5: Sending Ratios by Treatments and Periods

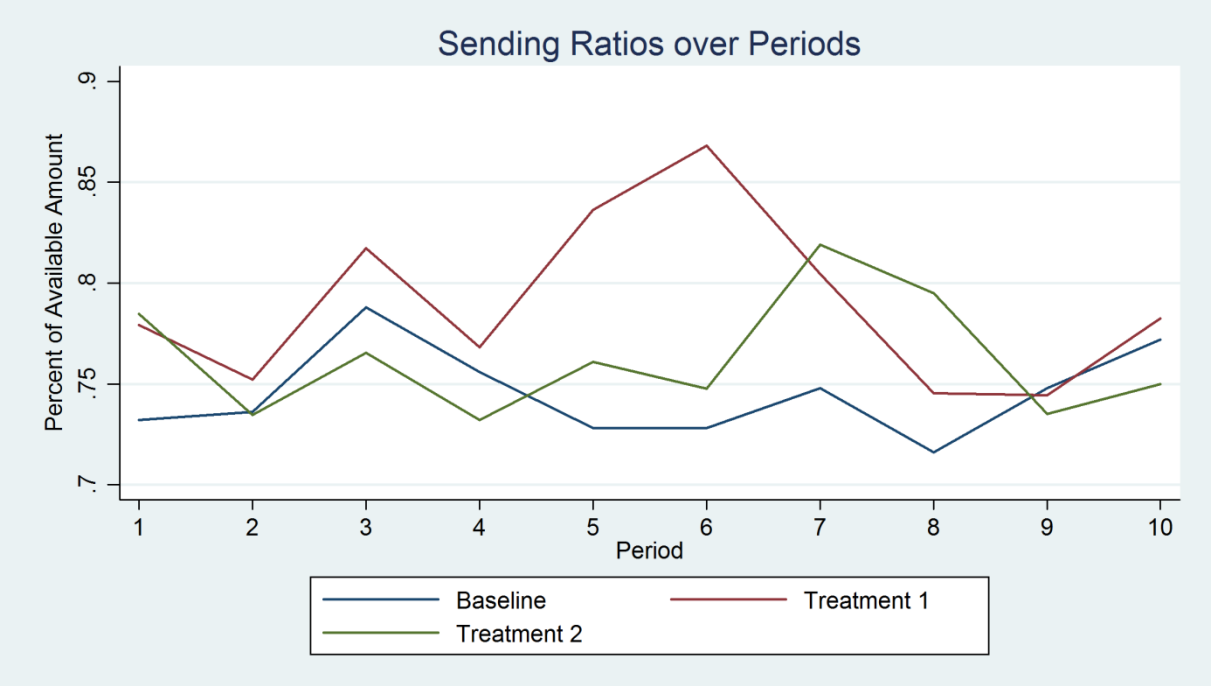
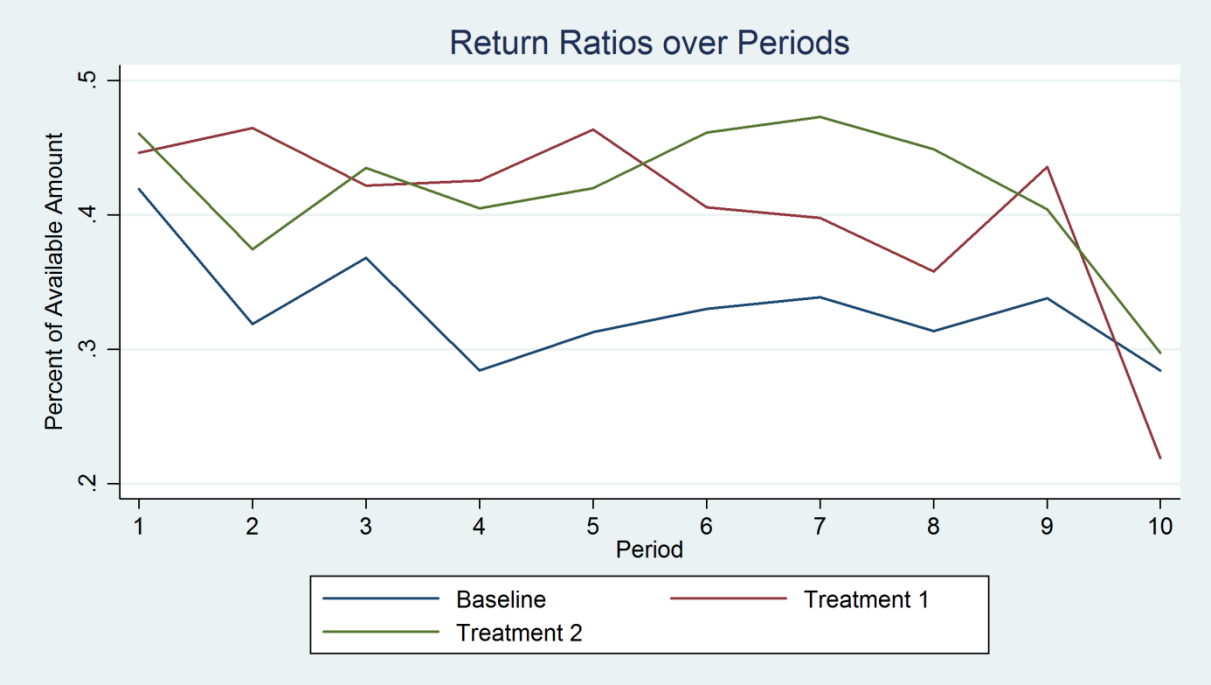


Figure 6: Return Ratios by Treatments and Periods



From an economic perspective, a central question regards welfare effects. Figure 7 illustrates the mean round payoffs of both players as well as the sum of both payoffs as a measure for welfare. As the graphic shows, the termination option led to a convergence of payoffs between trustors and trustees, i.e. trustees played less opportunistically. The differences between the baseline and the treatments have a p-value lower than 0.01 but the differences between the two treatments are not significant which is in line with hypothesis 3. Considering that in the treatments, trustors can also terminate early—which has an additional detrimental effect on the aggregated final payoffs—it may even be said that termination options lead to a welfare loss (*cf.* Figure 8).

Figure 7: Distribution and Welfare Effects of Termination Rights

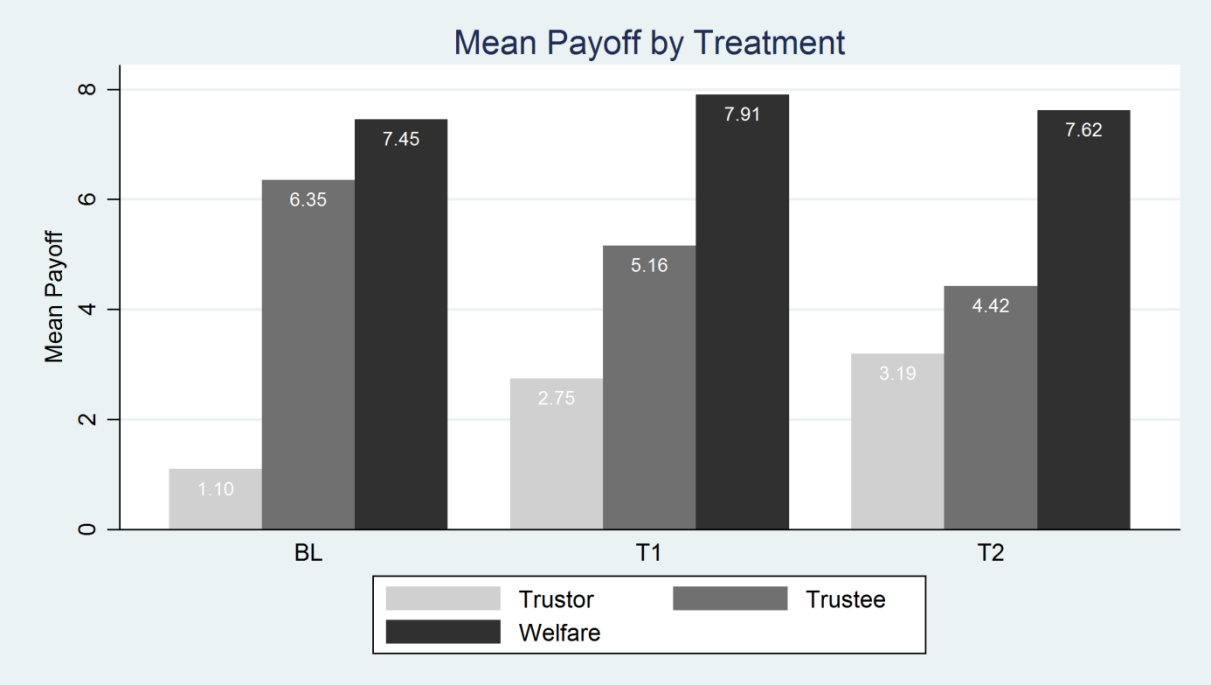
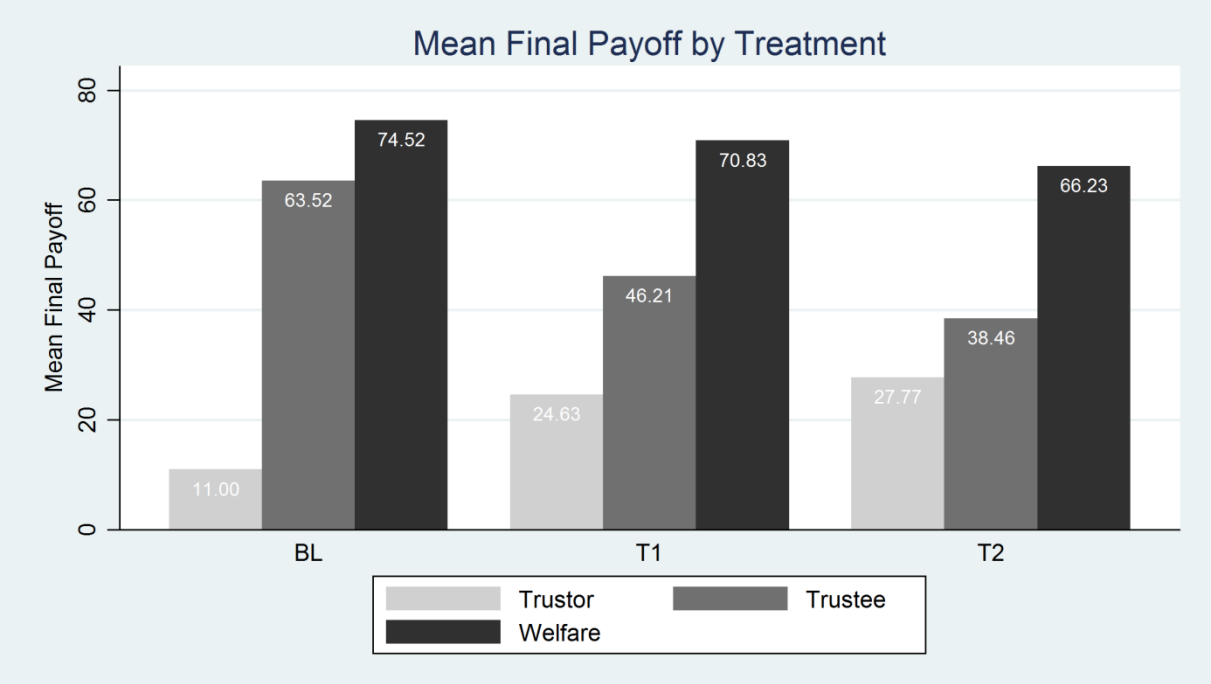


Figure 8: Mean Final Payoffs



To sum up, termination rights have a positive impact on the amount returned or the level of trustworthiness but only a negligible influence on the amount invested or the level of trust. Accordingly, the termination provision merely leads a redistribution of wealth.

Table 2: Sending Ratios across Periods

	Sending Ratio				First Differences		
Period	**BL**	**T1**	**T2**	**Total**	**BL-T1**	**BL-T2**	**T1-T2**
1	0.7320	0.7792	0.7846	0.7653	-0.0472	-0.0526	-0.00545
	0.1865	*0.2085*	*0.1848*	*0.1921*	(-0.83)	(-1.01)	(-0.10)
2	0.7360	0.7522	0.7346	0.7405	-0.0162	0.00138	0.0176
	0.1997	*0.2086*	*0.2134*	*0.2047*	(-0.27)	(0.02)	(0.29)
3	0.7880	0.8174	0.7654	0.7892	-0.0294	0.0226	0.0520
	0.2128	*0.2081*	*0.2153*	*0.2104*	(-0.48)	(0.38)	(0.86)
4	0.7560	0.7682	0.7320	0.7514	-0.0122	0.0240	0.0362
	0.2043	*0.2124*	*0.2174*	*0.2089*	(-0.20)	(0.40)	(0.58)
5	0.7280	0.8364	0.7609	0.7729	-0.108	-0.0329	0.0755
	0.2011	*0.2105*	*0.2061*	*0.2078*	(-1.80)	(-0.56)	(1.21)
6	0.7280	0.8682	0.7476	0.7794	-0.140*	-0.0196	0.121
	0.2011	*0.1756*	*0.2316*	*0.2099*	(-2.55)	(-0.30)	(1.92)
7	0.7480	0.8045	0.8190	0.7882	-0.0565	-0.0710	-0.0145
	0.2182	*0.2126*	*0.2064*	*0.2120*	(-0.90)	(-1.13)	(-0.23)
8	0.7160	0.7455	0.7950	0.7493	-0.0295	-0.0790	-0.0495
	0.2211	*0.2385*	*0.2012*	*0.2204*	(-0.44)	(-1.25)	(-0.73)
9	0.7480	0.7444	0.7350	0.7429	0.00356	0.0130	0.00944
	0.2002	*0.2431*	*0.2277*	*0.2183*	(0.05)	(0.20)	(0.12)
10	0.7720	0.7824	0.7500	0.7683	-0.0104	0.0220	0.0324
	0.2170	*0.2215*	*0.2203*	*0.2159*	(-0.15)	(0.33)	(0.43)
Total	0.7452	0.7907	0.7619	0.7648	-0.0455*	-0.0167	0.0288
	0.2038	*0.2129*	*0.2097*	*0.2091*	(-2.34)	(-0.88)	(1.43)

standard deviation in italics
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 3: Return Ratios across Periods

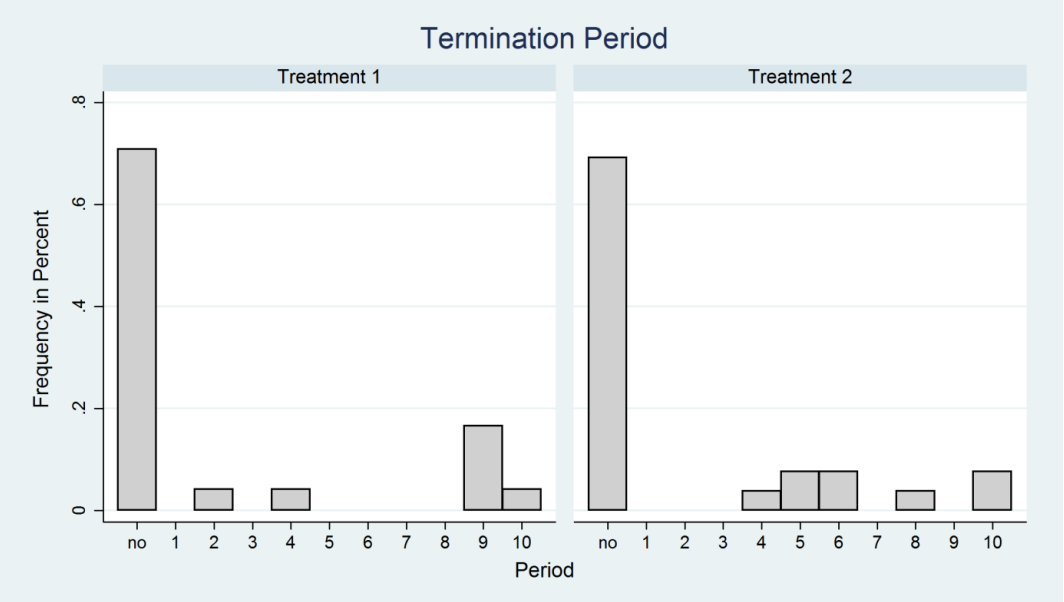
	Return Ratio				First Differences		
Period	**BL**	**T1**	**T2**	**Total**	**BL-T1**	**BL-T2**	**T1-T2**
1	0.4192	0.4463	0.4604	0.4422	-0.0271	-0.0412	-0.0141
	0.2315	*0.2261*	*0.3043*	*0.2547*	(-0.42)	(-0.55)	(-0.19)
2	0.3187	0.4644	0.3743	0.3835	-0.146**	-0.0556	0.0901*
	0.1728	*0.1167*	*0.1517*	*0.1592*	(-3.45)	(-1.22)	(2.34)
3	0.3681	0.4219	0.4350	0.4083	-0.0538	-0.0669	-0.0131
	0.1988	*0.1534*	*0.2304*	*0.1978*	(-1.05)	(-1.11)	(-0.24)
4	0.2841	0.4254	0.4048	0.3692	-0.141**	-0.121*	0.0206
	0.1804	*0.1086*	*0.1842*	*0.1730*	(-3.30)	(-2.34)	(0.47)
5	0.3128	0.4635	0.4201	0.3954	-0.151***	-0.107*	0.0434
	0.1795	*0.1042*	*0.1764*	*0.1691*	(-3.57)	(-2.09)	(1.01)
6	0.3301	0.4056	0.4612	0.3950	-0.0755	-0.131*	-0.0556
	0.2156	*0.1108*	*0.1766*	*0.1811*	(-1.54)	(-2.27)	(-1.23)
7	0.3387	0.3976	0.4728	0.3992	-0.0589	-0.134*	-0.0751
	0.2044	*0.0921*	*0.1918*	*0.1780*	(-1.30)	(-2.29)	(-1.63)
8	0.3135	0.3580	0.4487	0.3685	-0.0445	-0.135*	-0.0906
	0.1715	*0.1399*	*0.1698*	*0.1684*	(-0.98)	(-2.64)	(-1.88)
9	0.3379	0.4358	0.4041	0.3869	-0.0980*	-0.0662	0.0317
	0.1917	*0.0953*	*0.1814*	*0.1690*	(-2.21)	(-1.19)	(0.68)
10	0.2842	0.2193	0.2974	0.2698	0.0649	-0.0132	-0.0781
	0.2211	*0.2142*	*0.2732*	*0.2343*	(0.95)	(-0.17)	(-0.94)
Total	0.3307	0.4083	0.4195	0.3839	-0.0775***	-0.0888***	-0.0113
	0.1978	*0.1539*	*0.2109*	*0.1939*	(-4.75)	(-4.72)	(-0.64)

standard deviation in italics
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Termination Option

Roughly one third of the trustors terminated before the tenth round but none of the trustees used their right. As for the timing, there is no clear pattern discernible although there is a slight surge in period 9 for treatment 1 (*cf*. Figure 9).

Figure 9: Timing of Termination



To find out what prompted trustors to terminate early, we ran a series of logistic regressions with different independent variables.[2] The strongest driver of termination seems to be loss aversion. As can be seen in Table 4, receiving a payoff of zero or less increases the marginal probability of termination by 9.6%. The tolerance for negative payoffs seems be critical for taking termination decisions. This finding is in line with hypothesis 4 which predicts that losses for the trustor increase the likelihood of early termination.

Table 4: Log-Likelihood Estimation on Termination Right Use

TERMINATION	**Log Likelihood**	**Marginal Effect (at means)**
# Payoff Trustor <1	0.516***	0.096***
	(0.140)	(0.027)
Constant	-3.134***	
	(0.772)	
Observations	50	

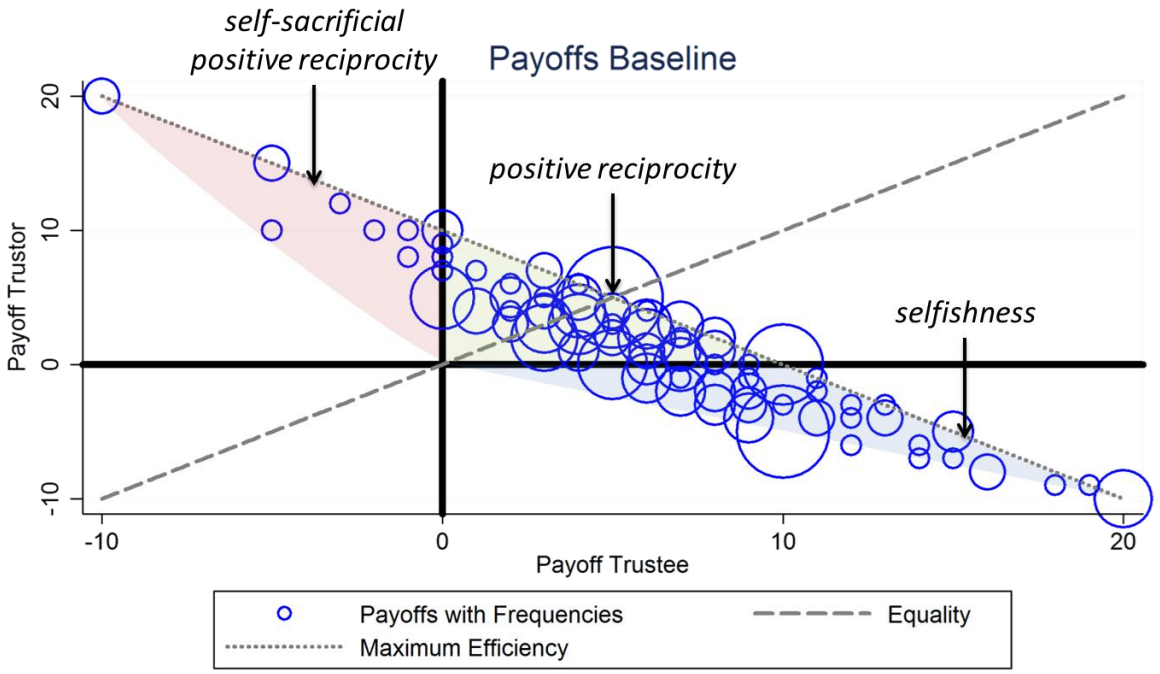
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[2] Other independent, but not significant variables were the average payoffs, difference in payoffs between the players, return ratios or minimum payoffs. The regressions were estimated separately due to high collinearity of the independent variables.

Strategies

The treatments also have an impact on the strategies chosen. This change becomes clearest in a descriptive graphical analysis. Figure 10, Figure 11 and Figure 12 plot the trustee's payoff per round on the abscissa and the trustor's round-based payoff on the ordinate. The endowments are centred to zero illustrated by the two bold lines. Trustors' payoffs above the horizontal bold line indicate positive reciprocity. Below this threshold, the trustors make losses. The size of the hollow circles show how often one particular outcome occurred.

Figure 10: Strategies Frequencies in the Baseline



By comparing the strategy choices of the different treatments, it becomes apparent that the circles "move up" (see red arrow in Figure 11) meaning that the frequency of positive reciprocal strategies increases. The trustees choose to return more units to the trustors. Especially the fair efficiency option where the trustor sends 10 units and the trustee returns 15 units—resulting in a payoff of 5 units for each player—is chosen frequently in treatment 1. In treatment 2, this shift is weaker than in treatment 1 but still discernible.

Figure 11: Strategies Frequencies in Treatment 1

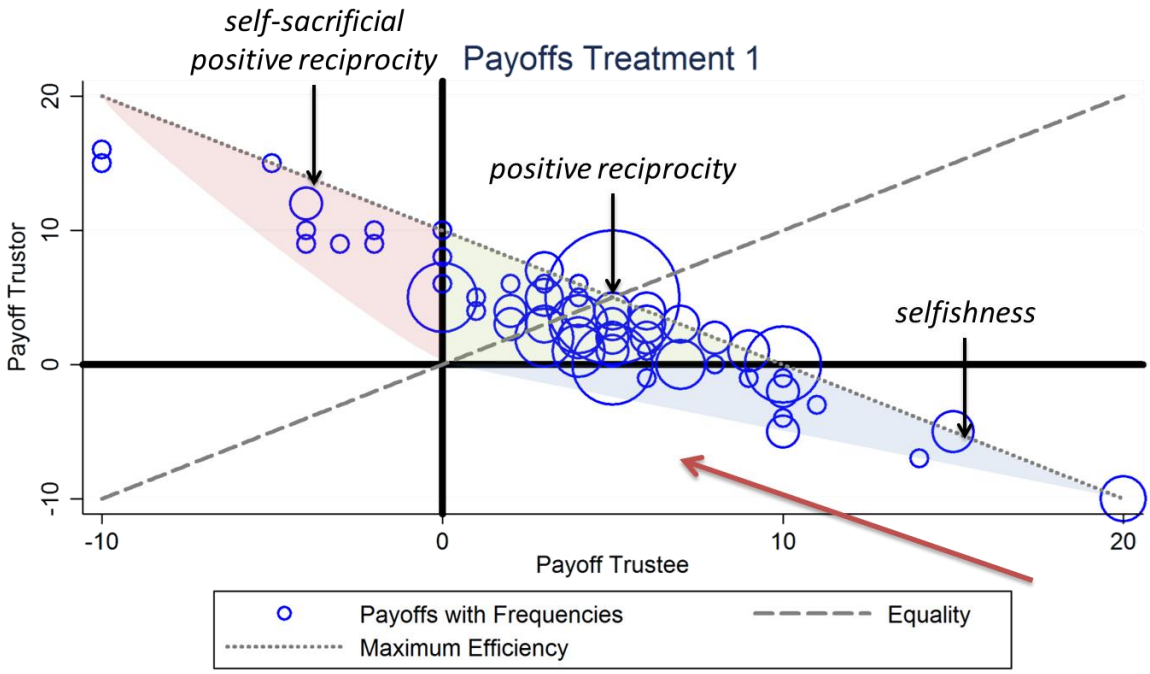
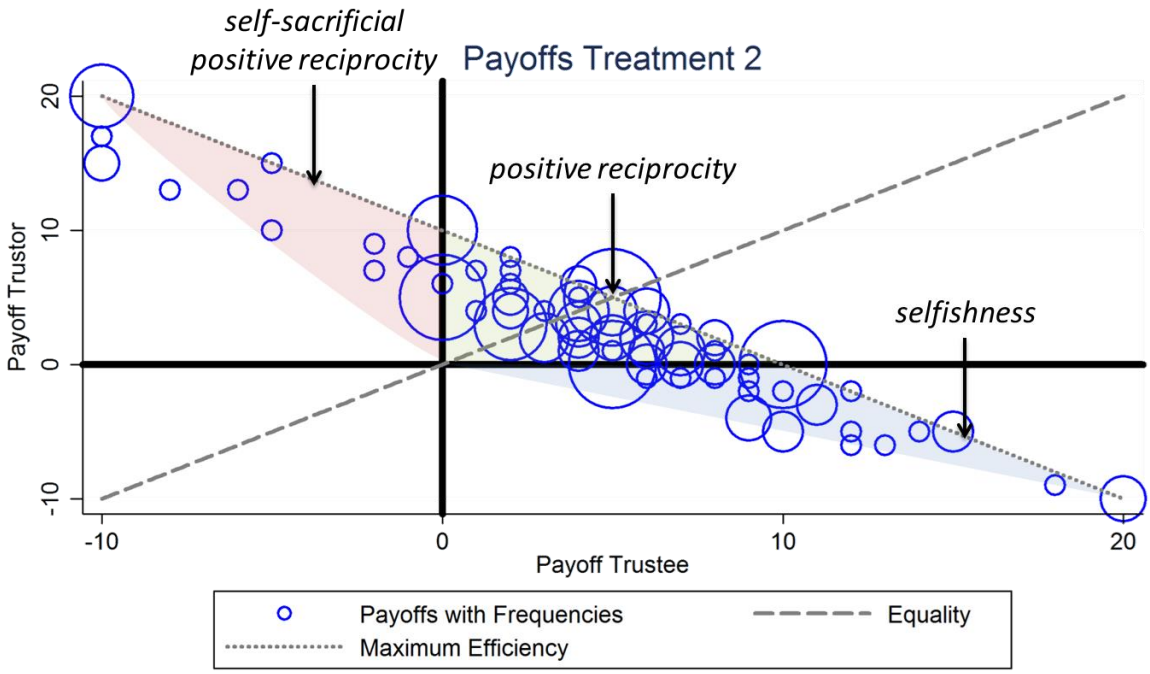


Figure 12: Strategies Frequencies in Treatment 2



Path Dependencies

Given that the players interact repeatedly with each other, it is interesting to explore whose decisions influence whom. Do higher investments lead to higher return ratios? Or is trustworthiness a prerequisite for trust? To answer these questions, we ran a cross-sectional time-series regression model with group fixed effects and an alternative, more robust

Arellano-Bover/Blundell-Bond model with clustered standards errors that includes lags of the dependent variable as covariates. Using the return ratio or the amount returned as a measure for reciprocity would yield unsatisfactory results. In fact, a regression on the return ratio would merely indicate disproportionate returns. Similarly, the amount returned neglects the proportionate return with respect to the available sum. A more adequate measure for reciprocity is the trustor's return on investment:

$$Return\ on\ Investment\ (ROI) = \frac{amount\ returned - amount\ invested}{amount\ invested}$$

The ROI reflects how worthwhile the cooperation is. In the first estimation (*cf.* Table 5), the ROI is the dependent variable and the amount invested is the independent variable. One interpretation would be that signalling dissatisfaction works more effectively in the treatments. If the trustor decreases the amount invested by one unit, the ROI increases by 0.055 percentage points and 0.074 in treatment 1 and 2, respectively, whereas it only increases by 0.005 in the baseline.

The reverse relationship yields even more interesting results. The second estimation (*cf.* Table 6) uses the amount invested as the dependent variable and the lagged ROI as the explanatory variable. In the baseline, the ROI has no impact on the amount invested in the next period. In treatment 1 and 2, however, an increase in the ROI by 1 basis point raises the amount invested in the subsequent period by 1.248 units and 0.783 units, respectively. Thus, the treatments apparently facilitate trust building. Trustors are more willing to increase their investments in response to higher return rates in the previous period. To conclude, trustworthiness is essential for trust building but a higher level of trust does not automatically lead to higher returns.

Table 5: Path Dependencies I

	Cross-Sectional Time-Series Regression Model			Arellano-Bover/Blundell-Bond-Model		
ROI	BL	T1	T2	BL	T1	T2
ROI (L1)				-0.203 **	0.142	-0.068
				(0.084)	(0.108)	(0.072)
Amount Invested	0.003	-0.049 **	-0.081 ***	-0.005 **	-0.055 ***	-0.074 ***
	(0.020)	(0.022)	(0.022)	(0.021)	(0.024)	(0.026)
Constant	0.042	0.695 ***	1.005 ***	0.136	0.722 ***	0.999 ***
	(0.1448)	(0.1136)	(0.153)	(0.165)	(0.204)	(0.237)
Observations	225	191	200	225	191	200
Number of Groups	25	23	26	25	23	26
Group Fixed Effects	YES	YES	YES			
Clustered Standard Errors				YES	YES	YES

L1: one lagged round
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Path Dependencies II

	Cross-Sectional Time-Series Regression Model			Arellano-Bover/Blundell-Bond-Model		
AMOUNT INVESTED	BL	T1	T2	BL	T1	T2
Amount Invested (L1)				-0.013	0.025	-0.078
				(0.082)	(0.107)	(0.141)
ROI (L1)	0.674***	1.139***	0.869***	0.399	1.248***	0.783***
	(0.256)	(0.394)	(0.305)	(0.299)	(0.352)	(0.226)
Constant	7.420***	7.500***	7.227***	7.511***	7.185***	7.824***
	(0.129)	(0.206)	(0.195)	(0.628)	(0.931)	(1.204)
Observations	225	191	200	225	191	200
Number of Groups	25	23	26	25	23	26
Group Fixed Effects	YES	YES	YES			
Clustered Standard Errors				YES	YES	YES

L1: one lagged round
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6 Conclusion

The aim of this study was to investigate the effect of termination rights on cooperation. In a repeated trust game with different termination options in the treatments, we found that the threat of termination induces positive reciprocity. Yet, the termination provision mainly has a distributional effect but does not increase welfare. The likelihood of early termination increases if the trustor's round-based profit is zero or less.

Overall, the results have important practical implications. For contract design, they suggest that termination provisions favour cooperative behaviour of the agent. However, principals would need additional incentives to increase investments. In other words, termination improves trustworthiness but does not affect trust. From a theoretical perspective, the study provides lacking empirical evidence on the influence of termination rights on opportunism.

As all empirical research, this study comes with limitations. Probably the most obvious restriction is that the participants' decisions were not incentivized. It might be that a study with actual payoffs would yield different outcomes. However, this possibility is outweighed in a study by Camerer and Hogarth (1999) who find that incentives have no effect on trust games. Another shortcoming is the external validity of the results. It could be questioned, for instance, whether a trust game truly mirrors inter-organisational collaborations. Conversely, it would be empirically challenging to measure the effect of contractual rights on collaboration outcomes, for example. Finally, some conclusions might be flawed by the relatively small sample that was unbalanced in terms of gender and fields of studies.

A nice extension for future research would be to include another treatment. Instead of allocating the termination right exogenously, one could let the trustees decide whether the trustors should have a termination right or not. Voluntarily ceding a termination right could have a strong signalling effect to trustors who might in turn invest more.

References

Ariño, Africa, Jeffrey J. Reuer, Kyle J. Mayer, and Juan Jané, "Contracts, Negotiation, and Learning: An Examination of Termination Provisions," *Journal of Management Studies*, 51 (2014), 379–405.

Arruñada, Benito, Luis Garicano, and Luis Vázquez, "Contractual Allocation of Decision Rights and Incentives: The Case of Automobile Distribution," *Journal of Law, Economics, and Organization*, 17 (2001), 257–284.

Berg, Joyce, John Dickhaut, and Kevin McCabe, "Trust, Reciprocity, and Social History," *Games and Economic Behavior*, 10 (1995), 122–142.

Boero, Riccardo, Giangiacomo Bravo, Marco Castellani, and Flaminio Squazzoni, "Reputational Cues in Repeated Trust Games," *The Journal of Socio-Economics*, 38 (2009), 871–877.

Bourgeois-Gironde, Sacha and Anne Corcos, "Discriminating Strategic Reciprocity and Acquired Ttrust in the Repeated Trust-Game," *Economics Bulletin*, 31 (2011), 177–188.

Camerer, Colin, *Behavioral Game Theory: Experiments in Strategic Interaction* (Princeton University Press, 2003).

Camerer, Colin F. and Robin M. Hogarth, "The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework," *Journal of Risk and Uncertainty*, 19 (1999), 7–42.

Cant, M. A. and R. A. Johnstone, "Self-Serving Punishment and the Evolution of Cooperation," *Journal of Evolutionary Biology*, 19 (2006), 1383–1385.

Das, T. K., "Time-Span and Risk of Partner Opportunism in Strategic Alliances," *Journal of Managerial Psychology*, 19 (2004), 744–759.

Fischbacher, Urs, "z-Tree: Zurich Toolbox for Ready-Made Economic Experiments," *Experimental Economics*, 10 (2007), 171–178.

Hadfield, Gillian K., "Problematic Relations: Franchising and the Law of Incomplete Contracts," *Stanford Law Review*, 42 (1990), 927–992.

Hagedoorn, John and Geerte Hesen, "Contract Law and the Governance of Inter-Firm Technology Partnerships? An Analysis of Different Modes of Partnering and Their Contractual Implications," *Journal of Management Studies*, 44 (2007), 342–366.

Hoffman, Elizabeth, Kevin McCabe, Keith Shachat, and Vernon Smith, "Preferences, Property Rights, and Anonymity in Bargaining Games," *Games and Economic Behavior*, 7 (1994), 346–380.

Jap, Sandy D. and Erin Anderson, "Safeguarding Interorganizational Performance and Continuity under Ex Post Opportunism," *Management Science*, 49 (2003), 1684–1701.

Johnson, Noel D. and Alexandra A. Mislin, "Trust Games: A Meta-Analysis," *Journal of Economic Psychology*, 32 (2011), 865–889.

Klein, Benjamin, "Transaction Cost Determinants of "Unfair" Contractual Arrangements," *The American Economic Review*, 70 (1980), 356–362.

Klein, Benjamin and Keith B. Leffler, "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy*, 89 (1981), 615–641.

Lyons, Bruce and Judith Mehta, "Contracts, Opportunism and Trust: Self-Interest and Social Orientation," *Cambridge Journal of Economics*, 21 (1997), 239–257.

Normann, Hans-Theo and Brian Wallace, "The Impact of the Termination Rule on Cooperation in a Prisoner's Dilemma Experiment," *International Journal of Game Theory*, 41 (2012), 707–718.

Parkhe, Arvind, "Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation," *The Academy of Management Journal*, 36 (1993), 794–829.

Robinson, David T. and Toby E. Stuart, "Financial Contracting in Biotech Strategic Alliances," *The Journal of Law and Economics*, 50 (2007), 559–596.

Schuessler, Rudolf, "Exit Threats and Cooperation under Anonymity," *Journal of Conflict Resolution*, 33 (1989), 728–749.

Serapio, Manuel G. Jr. and Wayne F. Cascio, "End-Games in International Alliances," *The Academy of Management Executive (1993-2005)*, 10 (1996), 62–73.

Stiglitz, Joseph E. and Andrew Weiss, "Incentive Effects of Terminations: Applications to the Credit and Labor Markets," *The American Economic Review*, 73 (1983), 912–927.

Weber, Libby, Kyle J. Mayer, and Jeffrey T. Macher, "An Analysis of Extendibility and Early Termination Provisions: The Importance of Framing Duration Safeguards," *Academy of Management Journal*, 54 (2011), 182–202.

Zwick, Rami, Amnon Rapoport, and John C. Howard, "Two-Person Sequential Bargaining Behavior with Exogenous Breakdown," *Theory and Decision*, 32 (1992), 241–268.

Appendix: Instructions

General Remarks

Herzlich Willkommen beim Experiment und vielen Dank für Ihre Teilnahme.
Ich werde Ihnen kurz einige allgemeine Erläuterungen zum Experiment vorlesen. Erst nachdem Sie diese gehört haben, klicken Sie bitte auf „Experiment starten".
Die Teilnehmer an dem Experiment befinden sich alle hier im Raum. Alle nehmen am selben Experiment teil. Mit dem Experiment wollen wir Erkenntnisse über menschliches Verhalten gewinnen.
Das Experiment dauert ca. 20 Minuten und im Schnitt werden Sie zwischen 5 und 9 Euro erhalten, je nach Ihrem Verhalten, mindestens jedoch 2 Euro.
Sie spielen anonym und können sich nicht untereinander absprechen. Auch die Auszahlung erfolgt anonym. Kein anderer Teilnehmer wird sehen, wie viel Sie erhalten.
Auch die Personen, die das Experiment durchführen, werden dies nicht erfahren.
Im Experiment erfolgt die Auszahlung in der Währung „Taler". 5 Taler entsprechen 10 Eurocent. 200 Taler werden am Ende beispielsweise in 4 Euro getauscht und ausbezahlt.
Während des Experimentes müssen Sie teilweise auf die anderen Teilnehmer warten. Dies kann auch mal einige Minuten in Anspruch nehmen.
Bitte bleiben Sie während dieser Zeit geduldig sitzen. Nutzen Sie die Zeit, um sich Ihr Verhalten während des Experimentes zu überlegen.
Wenn alle fertig sind, werden Sie nacheinander nach draußen gebeten. Dort erhalten Sie Ihre Auszahlung.
Alle Anweisungen und Erklärungen finden Sie auf den folgenden Bildschirmseiten. Bitte lesen Sie alle Informationen gründlich durch, bevor Sie einen Bildschirm per Mausklick verlassen.
Sie können einmal verlassene Bildschirme nicht erneut aufrufen.
Wenn Sie möchten, können Sie sich Notizen machen. Zettel und Stifte liegen für Sie an Ihrem Arbeitsplatz bereit. Ebenso ein Taschenrechner für die Berechnungen.
Bleiben Sie bitte ruhig an Ihrem Arbeitsplatz sitzen. Bitte unterlassen Sie jegliche Gespräche.
Sollten Sie Fragen haben, heben Sie bitte Ihre Hand. Wir kommen dann zu Ihnen.
Klicken Sie jetzt auf „Experiment starten".

Baseline Trustor

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person A zugeteilt. Person B befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100Taler als Startkapital. Das Spiel geht über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen zehn Runden mit der gleichen Person.

Pro Runde müssen Sie Person B mindestens 5 Taler (Pflichtbetrag) Ihres Startkapitals senden. Sie haben aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Ihnen gesendete Betrag wird automatisch verdoppelt und steht dann Person B zur Verfügung.

Im zweiten Schritt kann Person B in jeder Runde entscheiden, wie viele Taler sie an Sie zurücksenden möchte. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Ihnen gesendeten Betrags zuzüglich der 10 Taler, die Person B aus ihrem Startkapital pro

Runde zur Verfügung stehen. Der von Person B zurückgesendete Betrag gehört anschließend Ihnen. Mit der Entscheidung von Person B endet die Runde.}

Baseline Trustee:

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person B zugeteilt. Person A befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100 Taler als Startkapital. Das Spiel geht über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen zehn Runden mit der gleichen Person.

Pro Runde muss Person A Ihnen mindestens 5 Taler (Pflichtbetrag) ihres Startkapitals senden. Person A hat aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Person A gesendete Betrag wird automatisch verdoppelt und steht dann Ihnen zur Verfügung.

Im zweiten Schritt können Sie in jeder Runde entscheiden, wie viele Taler Sie an Person A zurücksenden möchten. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Person A gesendeten Betrags zuzüglich der 10 Taler, die Ihnen aus Ihrem Startkapital pro Runde zur Verfügung stehen. Der von Ihnen zurückgesendete Betrag gehört anschließend Person A. Mit Ihrer Entscheidung endet die Runde.

Treatment 1 Trustor:

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person A zugeteilt. Person B befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100 Taler als Startkapital. Das Spiel geht maximal über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen Runden mit der gleichen Person.

Pro Runde müssen Sie Person B mindestens 5 Taler (Pflichtbetrag) Ihres Startkapitals senden. Sie haben aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Ihnen gesendete Betrag wird automatisch verdoppelt und steht dann Person B zur Verfügung.

Im zweiten Schritt kann Person B in jeder Runde entscheiden, wie viele Taler sie an Sie zurücksenden möchte. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Ihnen gesendeten Betrags zuzüglich der 10 Taler, die Person B aus ihrem Startkapital pro Runde zur Verfügung stehen. Der von Person B zurückgesendete Betrag gehört anschließend Ihnen. Mit der Entscheidung von Person B endet die Runde.

Zusätzlich werden Sie vor jeder Runde gefragt, ob Sie weiterspielen oder das Spiel beenden möchten. Wenn Sie das Spiel vorzeitig beenden, wird das Spiel abgebrochen und beide erhalten die bis zur letzten Runde erspielten Auszahlungen. Wenn Sie das Spiel nicht vorzeitig beenden, endet das Spiel automatisch nach zehn Runden. Das Recht, das Spiel zu beenden, haben nur Sie, aber nicht Person B.

Treatment 1 Trustee:

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person B zugeteilt. Person A befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100 Taler als Startkapital. Das Spiel geht maximal über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen Runden mit der gleichen Person.

Pro Runde muss Person A Ihnen mindestens 5 Taler (Pflichtbetrag) ihres Startkapitals senden. Person A hat aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Person A gesendete Betrag wird automatisch verdoppelt und steht dann Ihnen zur Verfügung.

Im zweiten Schritt können Sie in jeder Runde entscheiden, wie viele Taler Sie an Person A zurücksenden möchten. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Person A gesendeten Betrags zuzüglich der 10 Taler, die Ihnen aus Ihrem Startkapital pro Runde zur Verfügung stehen. Der von Ihnen zurückgesendete Betrag gehört anschließend Person A. Mit Ihrer Entscheidung endet die Runde.

Zusätzlich wird Person A vor jeder Runde gefragt, ob sie weiterspielen oder das Spiel beenden möchte. Wenn sie das Spiel vorzeitig beendet, wird das Spiel abgebrochen und beide erhalten die bis zur letzten Runde erspielten Auszahlungen. Wenn Person A das Spiel nicht vorzeitig beendet, endet das Spiel automatisch nach zehn Runden. Das Recht, das Spiel vorzeitig zu beenden, hat nur Person A, Sie allerdings nicht.

Treatment 2 Trustor:

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person A zugeteilt. Person B befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100 Taler als Startkapital. Das Spiel geht maximal über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen Runden mit der gleichen Person.

Pro Runde müssen Sie Person B mindestens 5 Taler (Pflichtbetrag) Ihres Startkapitals senden. Sie haben aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Ihnen gesendete Betrag wird automatisch verdoppelt und steht dann Person B zur Verfügung.

Im zweiten Schritt kann Person B in jeder Runde entscheiden, wie viele Taler sie an Sie zurücksenden möchte. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Ihnen gesendeten Betrags zuzüglich der 10 Taler, die Person B aus ihrem Startkapital pro Runde zur Verfügung stehen. Der von Person B zurückgesendete Betrag gehört anschließend Ihnen. Mit der Entscheidung von Person B endet die Runde.

Zusätzlich werden Sie und Person B vor jeder Runde gefragt, ob Sie weiterspielen oder das Spiel beenden möchten. Sobald eine Person das Spiel vorzeitig beendet, wird das Spiel abgebrochen und beide erhalten die bis zur letzten Runde erspielten Auszahlungen. Wenn das Spiel nicht vorzeitig beendet wird, endet das Spiel automatisch nach zehn Runden.}

Treatment 2 Trustee:

Spielablauf:
In dem folgenden Spiel gibt es 2 Rollen: Person A und Person B. Ihnen wurde zufällig die Rolle von Person B zugeteilt. Person A befindet sich ebenfalls in diesem Raum. Beide Personen erhalten zu Beginn 100 Taler als Startkapital. Das Spiel geht maximal über zehn Runden und pro Runde stehen beiden Personen 10 Taler aus ihrem jeweiligen Startkapital zur Verfügung. Sie spielen in allen Runden mit der gleichen Person.

Pro Runde muss Person A Ihnen mindestens 5 Taler (Pflichtbetrag) ihres Startkapitals senden. Person A hat aber die Möglichkeit, diesen Betrag auf maximal 10 Taler zu erhöhen. Der von Person A gesendete Betrag wird automatisch verdoppelt und steht dann Ihnen zur Verfügung.

Im zweiten Schritt können Sie in jeder Runde entscheiden, wie viele Taler Sie an Person A zurücksenden möchten. Dieser Betrag ist minimal null und maximal der verdoppelte Wert des von Person A gesendeten Betrags zuzüglich der 10 Taler, die Ihnen aus Ihrem Startkapital pro Runde zur Verfügung stehen. Der von Ihnen zurückgesendete Betrag gehört anschließend Person A. Mit Ihrer Entscheidung endet die Runde.

Zusätzlich werden Sie und Person A vor jeder Runde gefragt, ob Sie weiterspielen oder das Spiel beenden möchten. Sobald eine Person das Spiel vorzeitig beendet, wird das Spiel abgebrochen und beide erhalten die bis zur letzten Runde erspielten Auszahlungen. Wenn das Spiel nicht vorzeitig beendet wird, endet das Spiel automatisch nach zehn Runden.