

Güth, Werner; Schmidt, Carsten; Sutter, Matthias

Working Paper

Fairness in the mail and opportunism in the internet: A newspaper experiment on ultimatum bargaining

SFB 373 Discussion Paper, No. 2001,42

Provided in Cooperation with:

Collaborative Research Center 373: Quantification and Simulation of Economic Processes,
Humboldt University Berlin

Suggested Citation: Güth, Werner; Schmidt, Carsten; Sutter, Matthias (2001) : Fairness in the mail and opportunism in the internet: A newspaper experiment on ultimatum bargaining, SFB 373 Discussion Paper, No. 2001,42, Humboldt University of Berlin, Interdisciplinary Research Project 373: Quantification and Simulation of Economic Processes, Berlin,
<https://nbn-resolving.de/urn:nbn:de:kobv:11-10049866>

This Version is available at:

<https://hdl.handle.net/10419/62747>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Fairness in the Mail and Opportunism in the Internet – A Newspaper Experiment on Ultimatum Bargaining[#]

Werner Güth*, Carsten Schmidt*, Matthias Sutter⁺

Humboldt-Universität zu Berlin^{*}
Institute for Economic Theory III
Spandauer Str. 1, D-10178 Berlin, Germany
{gueth,cschmidt}@wiwi.hu-berlin.de

University of Innsbruck⁺
Institute of Public Economics
Universitaetsstrasse 15, A-6020 Innsbruck, Austria
matthias.sutter@uibk.ac.at

June 12, 2001

[#] Financial support from the German Science Foundation (DFG grant no SFB 373/C5) is gratefully acknowledged.

Abstract

On May 11, 2001, readers of the Berliner Zeitung were invited to participate in an ultimatum bargaining experiment played in the strategy vector-mode: Each participant chooses not only how much (s)he demands of the DM 1.000-pie but also which of the nine possible offers of DM 100, 200, ..., 900 (s)he would accept or reject. In addition, participants were asked to predict the most frequent type of behavior. Three randomly selected proposer-responder pairs were rewarded according to the rules of ultimatum bargaining and three randomly chosen participants of those who predicted the most frequent type of behavior received a prize of DM 500. Decisions could be submitted by mail, fax, or via the internet. Behavior is described, statistically analyzed, and compared to usual laboratory ultimatum bargaining results.

JEL Classification: C93

Keywords: ultimatum bargaining, newspaper (or internet) experiment, fairness, distribution conflicts

1. Introduction

The notion of ultimatum bargaining has been introduced in Güth (1976). The first experiment with rather moderate pie sizes ranging from DM 4 to DM 10 has been performed in the winter semester 1977/78 at the University of Cologne (Güth, Schmittberger, and Schwarze, 1982). The rules of the game are as follows. If $p(>0)$ is the monetary pie, first the proposer can choose any demand d with $p \geq d \geq 0$ which then the responder can either accept or reject. Acceptance means that the proposer earns d and the responder $p-d$. In case of a rejection both earn nothing. Thus, the demand d is an ultimatum proposal or a take it or leave it-offer.

Of the many experimental studies of ultimatum bargaining (see Güth and Tietz, 1990, Güth, 1995, Roth, 1995, for surveys) few have used non-student participants. Newspaper experiments offer the chance to address a large audience from the general public and invite them to participate in an experiment.¹ To the best of our knowledge experiments with readers of newspapers all concentrated on the guessing game so far (Thaler, 1997, Selten and Nagel, 1998, Nagel et al., 1999, Fehr und Renninger, 2000). By inviting readers of the Berliner Zeitung on May 11, 2001, to participate in an ultimatum bargaining experiment we are able to provide insights into bargaining behavior and fairness preferences of a much broader audience than could be recruited for usual laboratory experiments. When conducting a newspaper experiment, the following questions are crucial to address: How should a newspaper experiment of the ultimatum game be designed? How can readers be induced to participate? And how does their behavior differ from the usually observed results?

In section 2 the experimental procedure is described in more detail. The large body of decision data by altogether 1163 participants is described and also (after restricting ourselves to the 1035 complete decision forms) statistically analyzed in section 3. The concluding section 4 compares the main regularities with those of usual ultimatum bargaining experiments.

2. Experimental procedure

In the following we will describe the experimental procedure of the newspaper experiment, the difficulties that we could observe, the recruited subject pool and how participants were rewarded.

¹ Advantages and disadvantages of newspaper experiments are thoroughly discussed by Nagel et al. (1999).

- i. We contacted a newspaper with a rather diverse readership since we did not want to substitute students by former students only. Fortunately, the Berliner Zeitung agreed to participate and also to share the costs of the experiment.
- ii. We proposed instructions which avoid all the usual terminology and technicalities and refer to the proposer as Charlotte and to the responder as Friedrich. The DM 1000-pie is framed as a gift of an American uncle to his unknown niece Charlotte and nephew Friedrich who do not know each other in spite of being relatives. The instructions actually used were then restructured and rewritten by the responsible journalist (Mangold 2001, Appendix A). A decision form was developed that could be printed in the newspaper (Appendix B) and integrated in the internet presence of the Berliner Zeitung (<http://www.berliner-zeitung.de/wirtschaftstheorie>).
- iii. We employed the strategy vector-mode which asks each participant to decide both as a proposer and as a responder by relying on the rather coarse grid of DM 100. More specifically, a participant had to make ten choices (the demand as a proposer or Charlotte, and nine acceptance decisions as Friedrich for the offers DM 100, 200, ...,900).²
- iv. To check how expectations about others differ from own behavior participants were asked to predict the most frequent pattern of behavior again in the form of a strategy vector. Three of the 64 participants, who actually did predict the most frequent pattern, were rewarded by a DM 500-prize.
- v. Participants could submit decisions by mail, fax or via the internet. Therefore, two different types of experimental media have been used: On the one hand a pen and paper fill-out form by the subjects that participated by letter post and fax. On the other hand a computerized fill-out form which was accessible by a standard web browser via the internet.

To guarantee some variety participants were not only recruited by the newspaper announcement in the Berliner Zeitung but also via email to several mailing lists. More specifically, we contacted the mailing list of the virtual experimental laboratory in Berlin (<http://experiment.wiwi.hu-berlin.de>) with a rather diverse subject pool of employees and students and the mailing list of the University of Innsbruck which includes exclusively students. The emails provided the link to the site where the experiment could be conducted

via internet. Table 1 gives an overview of subjects' characteristics for the three different pools (Berliner Zeitung, German internet, Austrian internet) from which we recruited participants. Remarkable aspects are that the non-academic readership of the *Berliner Zeitung* is with more than 61% much higher than in our mailing lists. Thus our attempt not to rely exclusively on academics had been well placed. Furthermore, readers of the *Berliner Zeitung* are usually older than the internet participants.

Table 1: Characteristics of the different subject pools participants were recruited from

	Berliner Zeitung ³ (letter/fax)	German internet ⁴	Austrian internet
Age			
0-19		8%	22%
20-23	17%	10%	56%
24-27		38%	15%
28-31	17%	18%	5%
32-35		16%	1%
>35	65%	10%	1%
Education			
9 years of schooling	21%	4%	0%
10 years of schooling	40%	10%	0%
12-13 years of schooling		40%	96%
Masters degree	39%	38%	4%
Ph.D.		8%	0%
Profession			Faculty of Study
Business administration		20%	78%
Economics		8%	
Other academic field		54%	21%
Other non-academic	>61%	18%	1%

In total we received 1163 decisions. 216 (19%) came by letter post, 132 (11%) by fax, and 815 (70%) via the internet. In spite of the efforts of the authors and the journalists 128 (11%) of all forms were only partly filled out. In most cases participants reacted in the responder-role only to their own offer as proposer.⁵ In total 47 (22%) letters and 17 (13%) faxes where

² By avoiding the demands, respectively offers, DM 0 and DM 1000 we do not only exclude the uninteresting border cases of (monetary) indifference for one party but also make sure that both players can win something in case of an agreement which seems desirable for a newspaper experiment.

³ Source: Medien Markt Berlin 1/01, Berliner Verlag GmbH & Co.

⁴ German internet participants were recruited via the mailing list of the virtual experimental laboratory. The numbers are taken from Anderhub et al. (2001), where subjects have been recruited by the same mailing list.

⁵ Rather than attributing this kind of behavior to a false consensus ("Others will choose the same demand and thus offer the same amount!") we rather think that this expresses forward induction-thinking ("The obvious result is that the proposer asks for half the pie which, of course, will be accepted; so there is no need to engage in counterfactual considerations for the other offers!").

only partly filled out.⁶ Only 64 internet-subjects (8%) did not complete the experiment, but stopped at a certain point. Internet-subjects were reminded when they provided invalid (or no) decisions, so forms could only be transmitted when all the necessary information was typed in. Therefore, missing or wrong entries of internet participants can not be observed in the computerized forms. Aggregating fax and letter submissions as pen and paper, we find that the frequency of incomplete decisions is significantly larger with pen and paper than with internet ($\chi^2 = 27.6$, $df = 1$; $p < 0.01$).

The participants who were randomly chosen for payment and an overview of the results have been published in the *Berliner Zeitung* two weeks after the initial announcement (Schmidt 2001). The monetary rewards were as follows:

- Of the three chosen pairs all reached an agreement with all proposers demanding 500 and all responders accepting this offer.
- The most frequent mode of behavior was to demand 500 as a proposer and to accept all offers as a responder. This was predicted by 64 (6%) of all participants. Three of them were randomly selected and received the prediction prize of DM 500.

3. Results

First, the large data set – compared to laboratory experiments – is analyzed on the aggregate level. Second, we consider the different types of media which were used to participate in the experiment (pen and paper versus internet). Third, we check whether there are differences in behavior with respect to the geographic origin of the participants. For most of our analysis we rely only on the 1035 complete decision forms.

3.1 Aggregate results

Table 2 summarizes the actual and expected demands as Charlotte. Both, actual and expected demands, are double peaked with a somewhat surprising minor peak at the most greedy demand of DM 900. 50% of actual demands are DM 500 and thus proposing to split the pie equally. DM 600 is the second most frequent demand (22.4%). 113 participants (10.9%) demand the highest possible amount of DM 900 which is the game-theoretic benchmark when payoffs are given by own monetary rewards. The arithmetic average of all demands is DM 589.6.

⁶ We did not count forms that could not be received because of transmission errors. In 4 cases a fax was not readable. Transmission errors via letter post and internet could not be controlled for by the experimenters.

Table 2: Actual and expected demands of proposer (Charlotte) – aggregate data

own demand in DM	actual demands (relative frequency in %)	expected demands (relative frequency in %)
100	0.6	0.1
200	0.0	0.1
300	0.5	0.5
400	2.7	1.8
500	50.0	49.1
600	22.4	22.1
700	9.1	15.9
800	3.8	3.8
900	10.9	6.6
average demand ($N = 1035$)	589.57	588.12

Expected demands are on average DM 588.1, which is similar to actual demands (there is no significant difference of both cumulative distributions, $p > 0.2$; Kolmogorov-Smirnov-test) A notable difference to actual demands is the fact that considerably less subjects (6.6%) expect most others to demand the maximum amount than subjects actually do (10.9%). Figure 1 plots the relative frequencies of the difference between a subject's own demand as Charlotte and her expected demand. Note that a negative sign indicates a subject expecting others to

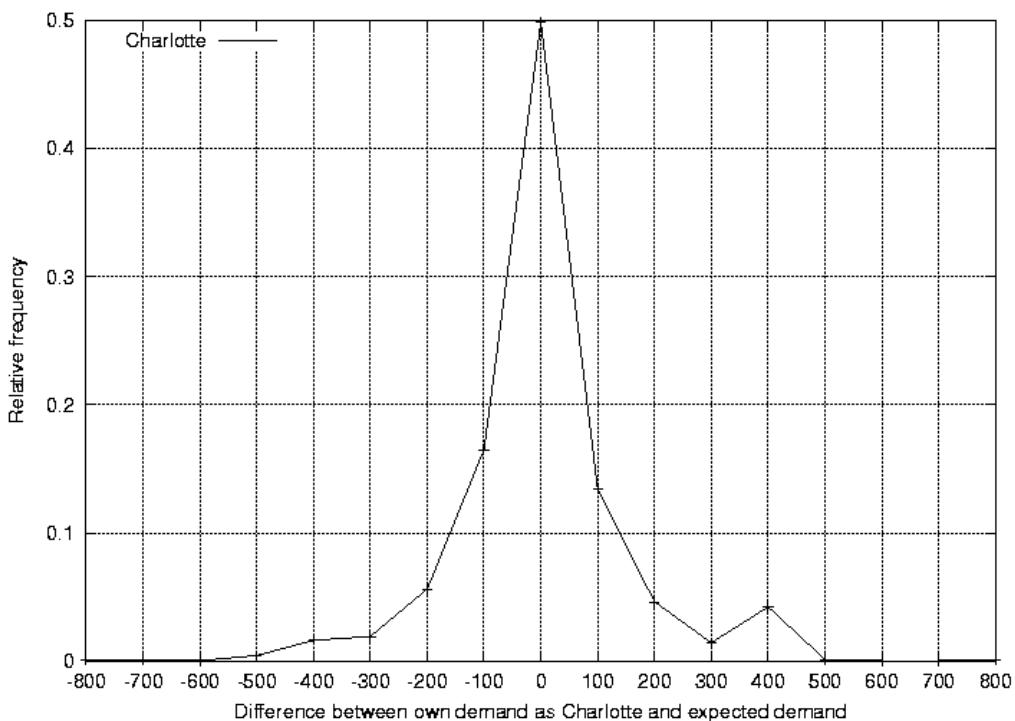


Figure 1: Relative frequency of difference between own demand as Charlotte and expected demand

demand more than the subject demands on his own. Zero difference is the most frequent behavior (49.9%). The difference ranges between +100 and –100 for 80% of the subjects. The rest of the decisions is distributed almost equally on both tails. Thus, half of the participants view their demand as typical whereas about one quarter considers themselves as more, respectively less modest.

Turning to behavior in the role of Friedrich Table 3 reports the relative frequencies of actually accepting a certain offer as well as of expecting others to accept. When an equal split is proposed, participants accept the offer most often (98.1%). The lowest offer of DM 100 is accepted in 34.9% of the cases. Although only one third of the subjects behave fully rational with respect to monetary payoffs, this share is much higher than in usual ultimatum experiments.⁷

Table 3: Actual and expected decisions as responder (Friedrich) - aggregate data

offer of	actual acceptance rates (relative frequency in %)	expected acceptance rates (relative frequency in %)
100	34.9	17.3
200	40.8	23.3
300	57.0	48.8
400	79.2	72.6
500	98.1	97.2
600	94.3	94.4
700	92.6	94.0
800	90.7	92.8
900	90.6	92.3

Note that the frequency of accepting offers monotonically declines from the peak at DM 500 when offers get larger. This result is driven by what we call non-monotonic strategies.⁸ A monotonic strategy is characterized by accepting all offers above a certain minimum acceptance level $min \geq 100$. In the role of Friedrich, 90.6% of the subjects have monotonic strategies. The rest has two kinds of non-monotonic strategies: First, 47 subjects (4.5%) accept only one single offer with 40 of them accepting only DM 500 and rejecting all other offers.⁹ Another 47 subjects accept two or more offers in an intermediate range, rejecting all

⁷ Since most ultimatum experiments do not employ the strategy (vector) method the evidence to test responses to lowest offers is scarce (see Güth and Tietz, 1990). But all the available evidence clearly indicates that 10%-offers are hardly ever accepted.

⁸ Non-monotonic response behavior is by no means irrational. It indicates a strong aversion against more or less biased reward allocations. Whereas rejection of too low offers can be justified by the argument that it costs little to punish, rejection of too high offers implies an even larger sacrifice of the responder than for the proposer.

⁹ Our guess is that most incomplete decision forms actually are aiming at non-monotonic response behavior in the sense that unanswered offers are viewed as unacceptable.

offers below a minimum *and* above a maximum (with $\max < 900$). Only 3 subjects switched more than once from accepting to rejecting such as accepting the offers of DM 100, 300 and 500 to 700.

Figure 2 shows the difference between the actual frequencies of accepting and the expected frequency for given offers. Note that a positive sign indicates that subjects actually accept more than they expect others to accept. This is the case for offers from 100 to 500. For these (lower) offers subjects are much more often willing to accept an offer than they expect others to be willing. Hence, subjects expect others to care less for money and more for equality than they do themselves (the frequency distributions of actual and expected decisions as Friedrich are significantly different for offers ranging from DM 100 to DM 400; $\chi^2 > 10$ in any case; $df = 1$; $p < 0.01$).

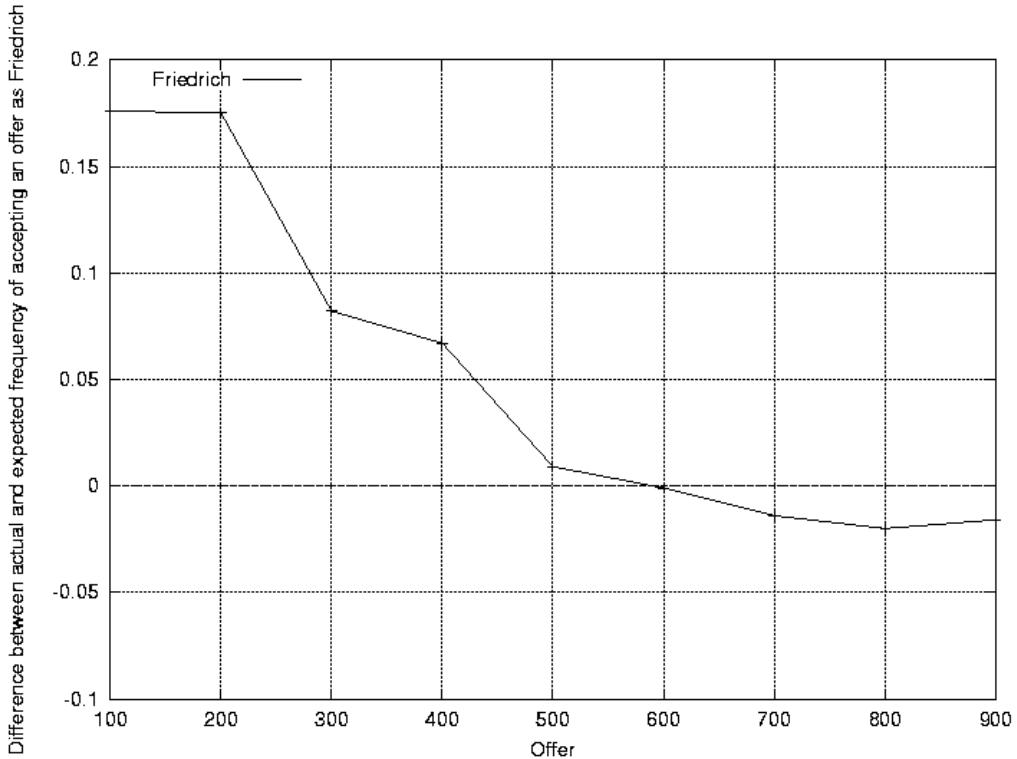


Figure 2: Differences between actual and expected frequency of accepting an offer as Friedrich

3.2 Differences in media type

For the following analysis we pool the fax and letter submissions¹⁰ and compare them to internet submissions. This allows us to check whether participants using pen and paper behave differently from those using the computerized version. Our data set of complete decision forms consists of 284 (27.5%) letter/fax forms and 751 (72.5%) forms submitted via the internet.

Table 4 reports actual and expected demands as Charlotte for both types of media. On average, internet participants demand DM 604.3, which is 9.7% more than fax/letter participants with an average demand of only DM 550.7. Whereas 64.1% of fax/letter participants propose an equal split, only 44.7% of internet participants do so. Very remarkable is the share of 13.6% of internet participants demanding the maximum amount of DM 900. Only 3.9% of fax/letter participants decide for maximum exploitation. The demands as Charlotte are significantly different between both types of media both with regard to mean values as well as with regard to the distribution of demands ($p < 0.01$, U-test¹¹).

Expected demands in the role of Charlotte also differ between both types of media ($p < 0.05$, t-test). However, the differences are not as pronounced as observed in actual demands. Internet (fax/letter) participants expect, on average, a demand of DM 593.9 (572.9) and 47.1% (54.2%) of subjects expect others to demand DM 500 in the role of Charlotte. Thus internet participants often view others as being relatively more equity oriented.

Table 4: Actual and expected demands of proposer (Charlotte) by medium

own demand in DM	actual demands (relative frequency in %)		expected demands (relative frequency in %)	
	letter/fax	internet	letter/fax	internet
100	0.4	0.7	0.0	0.1
200	0.0	0.0	0.4	0.0
300	0.0	0.7	0.0	0.7
400	2.5	2.8	0.7	2.3
500	64.1	44.7	54.2	47.1
600	20.8	23.0	26.8	20.4
700	7.0	9.9	10.6	18.0
800	1.4	4.7	2.8	4.1
900	3.9	13.6	4.6	7.3
average demand	550.70 (<i>N</i> = 284)	604.26 (<i>N</i> = 751)	572.89 (<i>N</i> = 284)	593.87 (<i>N</i> = 751)

In the role of the responder (Friedrich) subjects accept the equal split most often, i.e., in 98.9% of the letter/fax submissions and 97.7% of the internet submissions, respectively. Yet, the equal split is the only offer in which the relative frequency of accepting is higher in letter/fax submissions than internet submissions as can be seen in Table 5. A remarkable 39% of internet participants accept the smallest possible offer of DM 100; only 23.9% of fax and letter participants do so. Relative acceptance rises monotonically until the equal split and falls again thereafter. Whereas in the internet acceptance levels stay above 93% for offers larger than DM 500, they decrease monotonically to 82% for an offer of DM 900 in faxes and letters due to non-monotonic response behavior. With the exception of the equal split internet participants accept each possible offer significantly more often than fax/letter participants (χ^2 -test for each offer separately, $df = 1$; $p < 0.01$).

The results on expected behavior as Friedrich mirror actual behavior as can be judged from Table 5. Expectations on acceptance levels are significantly different between both types of media with the exception of DM 500- and DM 600-offers. Both letter/fax and internet participants expect others to accept less often than they actually do up to an amount of DM 500. Hence, with relatively low offers participants think that others care, on average, less for money and reject the (relatively low) amount more often. The reverse is true for offers starting from DM 600, although the difference between actual and expected behavior is, by far, less pronounced in this range of offers than for offers from DM 100 to 400.

Table 5: Actual and expected decisions as responder (Friedrich) by medium

offer of	actual acceptance rates (relative frequency in %)		expected acceptance rates (relative frequency in %)	
	letter/fax	internet	letter/fax	internet
100	23.9	39.0	12.3	19.2
200	27.8	45.7	17.6	25.4
300	44.0	61.9	41.9	51.4
400	73.9	81.2	68.3	74.2
500	98.9	97.7	97.2	97.2
600	90.1	95.9	90.5	95.9
700	85.9	95.1	89.4	95.7
800	83.5	93.5	88.0	94.5
900	82.0	93.9	87.0	94.3

¹⁰ We tested for differences in averages or in the distribution of values between fax and letter submissions but found none. Therefore, we decided to group the data by letter/fax and internet in the following.

¹¹ Due to the discreteness of our variable we do not apply a parametric t-test.

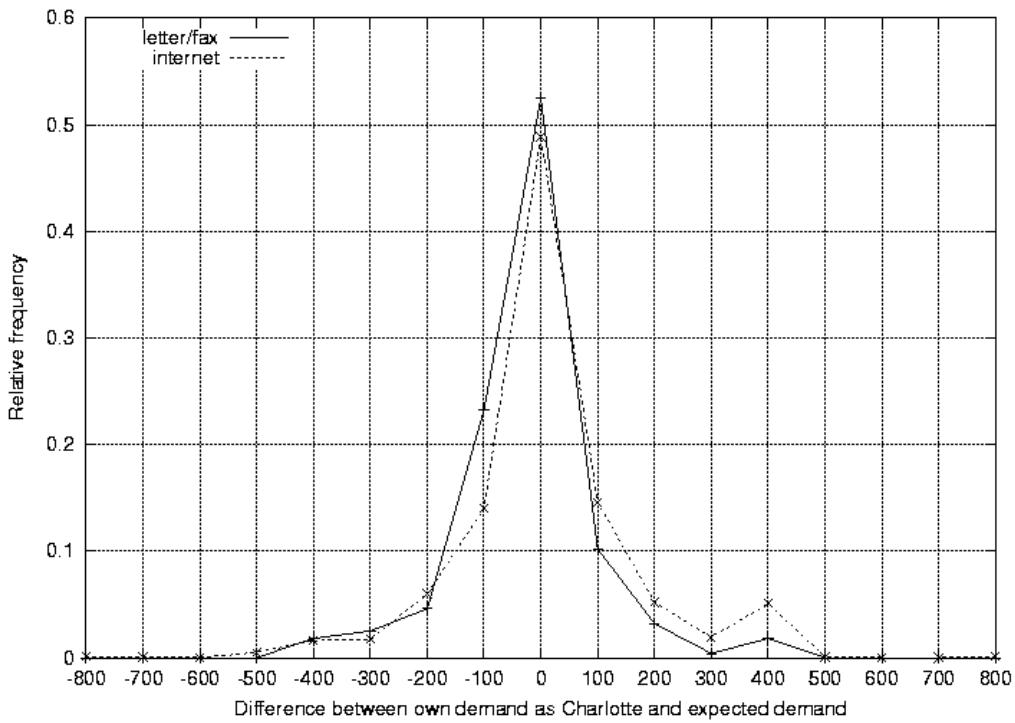


Figure 3: Own demand minus expected demand: letter/fax versus internet

In the following we will examine whether responders in the role of Friedrich differ also with respect to chosen strategies. Remember that we call a strategy monotonic if a responder accepts all offers above a certain minimum acceptance level $min \geq 100$. 93.9% of internet participants, but only 82.0% of fax/letter participants can be classified as having a monotonic strategy in the role of responder ($\chi^2 = 33.9$, $df = 1$; $p < 0.01$). A similar result holds for the expectations of others' strategies: letter/fax-participants expect the strategies to be more often non-monotone (13.0%) than internet participants (5.7%) ($\chi^2 = 15.4$, $df = 1$; $p < 0.01$).

Furthermore, we compare the differences of the own demand as Charlotte and the expectations about the most frequent demand of other participants. Subjects with a negative (positive) difference expect others to be meaner (more generous). Figure 3 shows the relative frequencies of differences. Interestingly, the relatively more game-theoretic 'rational' internet-participants (judged by their higher demands and their higher frequency of accepting low offers) expect others more often to be more generous than themselves than letter/fax participants do (27% vs. 15.5%). Letter/fax participants, on the contrary, tend to expect more often others to be meaner than themselves than internet participants do (32% vs. 24.1%). This

altogether indicates that internet participants expect and accept to (be) exploit(ed) whereas pen and paper-participants resent exploitation more strongly. There is thus more fairness in the mail and more opportunism in the internet.

Finally, we regarded only participants with monotonic strategies as Friedrich and classified participants according to the sum of the own demand d as Charlotte and the minimum acceptance level min as Friedrich. We classify three types:

- the careful ones where $d + min < 1000$,
- the dogmatic ones where $d + min = 1000$, and
- the greedy ones where $d + min > 1000$.

Table 6 summarizes the relative frequency of different types in both media. Although in the internet we have four percentage points more greedy types, the distribution of types as classified by the sum of own demand and minimum acceptance level is not different between both media.

Table 6: Types and medium

type	sum $d + min$	relative frequency (in %)	
		fax/letter	internet
careful	< 1000	60.9	58.9
dogmatic	= 1000	36.5	33.3
greedy	> 1000	2.6	7.8

Summarizing the results of this subsection we conclude that the behavior of internet participants seems more opportunistic¹², whereas behavior of fax/letter participants looks fairer. These differences can either be attributed to behavior depending on the type of medium or to differences in the subject pool.

3.3 Differences in geographic origin

Since we have observed different patterns of behavior in both types of media we separate our data into letter/fax and internet participants and check whether geographic origin of participants in the respective medium plays a role. A valid form had to contain a unique postal address including the zip code. From the zip codes one can assign participants to different regional districts. We attributed “East” for participants who live in the “Neue Bundesländer” and East-Berlin, and “West” for subjects who live in the “Alte Bundesländer” and West-Berlin. By letter and fax we received 92 valid forms from the West and 192 forms from the

¹² In section 4 below it will be shown that demanding 500 is opportunistic, too, in the sense of maximizing one’s own expected payoff given that expectations are consistent with actual response behavior.

East. Via the internet 200 participants with valid forms were from Austria, 383 from the East and 168 from the West.

3.3.1 Letter and Fax submissions

When we compare the East and West subjects, who participated via letter/fax, most of the decision variables do not differ significantly. As Charlotte East residents demand, on average, DM 550, participants living in the West DM 552. There are some marginal differences in their behavior as Friedrich: All 192 East participants accept the equal split whereas 'only' 96.7% of West participants do. East participants accept low offers less often (the effect is, however, only significant for an offer of 400). Altogether, the group of participants who responded via letter and fax seems to be quite homogenous in their decisions irrespective whether they live in the East or in the West.

3.3.2 Internet submissions

Referring to our internet participants the previous result is, basically, replicated: Behavior of participants living either in the East or the West of Germany does not differ significantly. Because we recruited German internet participants mainly from the mailing list of the virtual experimental laboratory in Berlin we would conclude that we can identify a rather homogenous subject pool of former participants of experiments that consists to a large extent, yet not exclusively, of students. We conclude from this that the major difference in the subject pool is the medium¹³ by which one participates and not the geographical origin as far as German participants are concerned.

In a next step we will compare this group of German internet participants as a whole to the Austrian internet participants. As is evident from Table 1, Austrian internet participants are drawn from a mailing list containing exclusively students, with almost 80% of them studying either economics or business administration. Austrian participants demand more as their German counterparts as Charlotte (DM 618.5 vs. DM 599.1; $p < 0.05$; two-sided U-test) and expect others to demand more in this role (DM 620 vs. DM 584.4; $p < 0.01$, U-test). Austrians are significantly more often willing to accept offers above DM 500 ($p < 0.05$ in any case; χ^2 -test). Furthermore, we can observe that Austrians more often have a monotonic strategy as Friedrich than Germans have (97% vs. 92.7%; $\chi^2 = 4.6$, $df = 1$; $p < 0.05$).

4. Comparison with usual ultimatum experiments and conclusions

Let us start with the most surprising result, namely the astonishing fact that acceptance of all offers is the mode of responder behavior.

Conclusion 1: Compared to usual ultimatum bargaining experiments the willingness to accept unfair offers, e.g. of only 10%-shares, is surprisingly high, especially for participants using the internet.

One might explain Conclusion 1 by the old conjecture that, although acceptance thresholds increase with pie sizes, relative acceptance thresholds, i.e. acceptance thresholds divided by pie sizes, go down when pies become large. This conjecture could not be confirmed for usual ultimatum experiments (see, for instance, Güth and Tietz, 1990) what might be due to their rather moderate pie sizes¹⁴ (the lowest offer of DM 100 in our experiment is larger than the pies in most other ultimatum experiments). The reason would be that more money will help to overcome the frustration caused by unfair offers.¹⁵

Since offers larger than 500 are slightly less acceptable than the fair offer of 500, only offers in the range from 100 to 500 are candidates for maximizing expected proposer gains when assuming rational expectations. In Figure 4 we have plotted the expected proposer profits for all such offers, separating letter/fax and internet participants. The expected profit maximising offer is DM 500 in both cases. The unprofitability of meager offers is, however, less striking for internet participants than for those who rely on pen and paper. When including incomplete decisions (assuming that offers to which one did not react at all are rejected) the optimality of fair splits when only confronting pen and paper-participants is even more striking. In spite of Conclusion 1 offering the equal split is best what justifies

Conclusion 2: The modal behavior of offering DM 500 (when expectations coincide with actual responder behavior) and accepting all offers is consistent with maximizing own expected profits.

¹³ Although readers of the Berliner Zeitung could also rely on the internet, the other participants were purely approached by using electronic mailing lists. Thus the medium of participation could also reflect different compositions of subject pools.

¹⁴ Since in usual ultimatum experiments every pair is paid, the expected gains in usual ultimatum experiments can, of course, be larger (see Bolle and Ockenfels, 1990, as well as Cubitt, Starmer and Sugden, 1998, for comparing high random versus low but certain payment procedures).

¹⁵ Frustration might, however, also increase with pie size, especially when the pie is the product of previous investments by both partners like, for instance, in experiments with advance production (see Gantner, Güth and Königstein, 2001, Hackett, 1993, and Königstein, 2000).

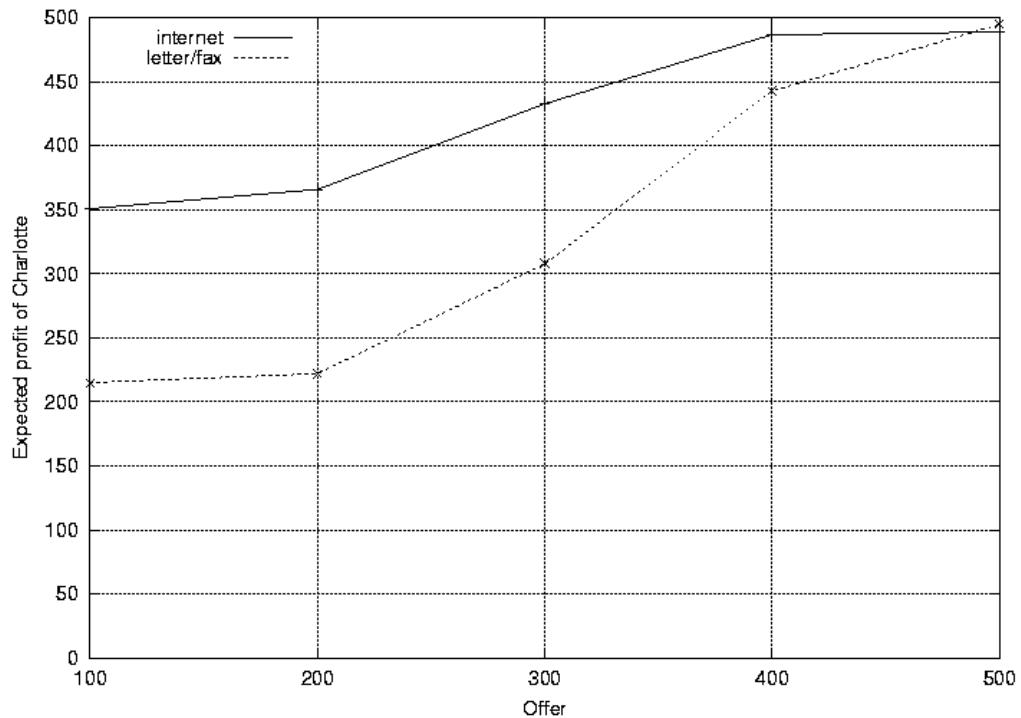


Figure 4: Expected profits of offers DM 100 to 500 separated by letter/fax and internet.

A third remarkable result is the 9% proportion of non-monotonic response behavior which so far has been only rarely observed (see, however, Güth and Huck, 1997, who unfortunately used a biased elicitation method). If one is strictly inequality averse, rejection of extremely generous offers larger than 500 is as natural as (but far more costly than) the rejection of too low offers. Rejecting high offers means that the responder sacrifices more than the proposer does. Participants who refuse too low and too high offers are not mainly interested in punishing proposers but insist on fair outcomes.

Conclusion 3: Insisting on fair outcomes is the main motivation of several participants with non-monotonic response strategies. This behavior is more frequently observed when relying on mail or fax than for internet-participants.

Bibliography

Anderhub, V., R. Müller and C. Schmidt (2001): Design and Evaluation of an Economic Experiment via the Internet, *Journal of Economic Behavior and Organization* (forthcoming).

Bolle, F. and P. Ockenfels (1990): Prisoners' dilemma as a game with incomplete information, *Journal of Economic Psychology* 11(1), 69-84.

Cubitt, R. P., C. Starmer and R. Sugden (1998): On the validity of the random lottery incentive system, *Experimental Economics* 1(2), 115-132.

Fehr, E. and S.-V. Renninger (2000): Gefangen in der Gedankenspirale. *DIE ZEIT*, Nr. 48/2000.

Gantner, A., W. Güth and M. Königstein (2001): Equitable choices in bargaining games with joint production, *Journal of Economic Behavior and Organization* (forthcoming).

Güth, W. (1976): Towards a more general analysis of von Stackelberg-situations, *Zeitschrift für die gesamte Staatswissenschaft* 132, 592-608.

Güth, W. (1995): On ultimatum bargaining - A personal review, *Journal of Economic Behavior and Organization* 27, 329-344.

Güth, W., R. Schmittberger, and B. Schwarze (1982): An experimental analysis of ultimatum bargaining, *Journal of Economic Behavior and Organization* 3(4), 367-388.

Güth, W. and R. Tietz (1990): Ultimatum bargaining behavior – A survey and comparison of experimental results, *Journal of Economic Psychology* 11(3), 417-449.

Güth, W. and S. Huck (1997): From ultimatum bargaining to dictatorship – An experimental study of four games varying in veto power, *Metroeconomica* 48(3), 262-279.

Hackett, S. (1993): An experimental analysis of surplus sharing in incomplete contracts, *Discussion Paper*, Bloomington: Indiana University.

Königstein, M. (2000): *Equity, efficiency and evolutionary stability in bargaining games with joint production*, Lecture Notes in Economics and Mathematical Systems, vol. 483, Berlin/Heidelberg: Springer-Verlag.

Mangold, I. (2001): Das 1.000 – Mark – Gewinnspiel, *Berliner Zeitung*, No. 109, May 11, 2001, p.14, Gruner + Jahr.

Nagel, R., A. Bosch-Domènech, A. Satorra, and J. García-Montalvo (1999): One, Two, (Three), Infinity: Newspaper and Lab Beauty-Contest Experiments. *Working paper*, Universitat Pompeu Fabra, Barcelona.

Selten R., and R. Nagel (1998): Das Zahlenwahlspiel – Hintergründe und Ergebnisse, *Spektrum der Wissenschaft*, February, 16-22.

Roth, A. E. (1995): Bargaining experiments, in: *Handbook of Experimental Economics*, J. Kagel and A. E. Roth (eds.), 253 - 348, Princeton, N.J: Princeton University Press.

Schmidt, C. (2001) Das 1000 - Mark - Gewinnspiel - Wie haben sich unsere Leser entschieden?, *Berliner Zeitung*, No. 120, May 25, 2001, p. 16, Gruner + Jahr.

Thaler, R. (1997): Giving markets a human dimension, *Financial Times*, section Mastering Finance 6, June 16.

Appendix A: Instructions

Das 1000-Mark-Gewinnspiel

Wie würden Sie sich entscheiden?

Wer in Standard-Lehrbücher der Wirtschaftswissenschaften der vergangenen Jahrzehnte schaut, findet dort die Behauptung, dass Experimente in den Wirtschaftswissenschaften nicht möglich seien. Das hat sich mittlerweile geändert. Zum Beispiel an der Humboldt-Universität. Dort arbeitet das Institut für Wirtschaftstheorie III unter Werner Güth schon lange mit Experimenten, die entweder als Laborversuch mit eigens eingeladenen Studenten oder eben als Gewinnspiele für eine breite Öffentlichkeit über eine Zeitung abgewickelt werden. Heute stellen wir Ihnen das 1000-Mark-Gewinnspiel vor, das das Institut in Kooperation mit der Berliner Zeitung durchführt, und laden Sie ein, daran teilzunehmen. Am 25. Mai werden dann in dieser Rubrik die Gewinner des Gewinnspiels bekannt gegeben und ein Hintergrundbericht die Ergebnisse des Experiments interpretieren.

Die Spielanordnung stellt sich anschaulicherweise so dar: Es gibt einen Onkel in Amerika, der hat eine Nichte und einen Neffen in Deutschland: Charlotte und Friedrich. Sie sind miteinander verwandt, kennen sich aber nicht. Diesen beiden möchte ihr Onkel zusammen 1000 Mark schenken. Er knüpft diese milde Gabe allerdings an die Bedingung, dass zuerst Charlotte einen Vorschlag zu machen hat, welchen Anteil von den 1000 Mark sie für sich möchte und wie groß entsprechend der Rest ist, den sie für Friedrich vorsieht. Wenn Friedrich mit der Aufteilung Charlottes einverstanden ist, überweist der Onkel umstandslos die entsprechenden Beträge auf ihre Konten. Lehnt Friedrich Charlottes Vorschlag jedoch ab, erhalten beide nichts. Ein Beispiel: Sieht Charlotte 700 Mark für sich, 300 für Friedrich vor, so kann Friedrich immerhin 300 Mark einstreichen. Schlägt er jedoch das Angebot aus, dann gehen beide leer aus. Sie, lieber Leser, können - wenn Sie mitmachen und Glück haben - für die Rolle von Charlotte oder für die von Friedrich ausgewählt werden. Wir werden sechs Teilnehmer(innen) auswählen, aus denen wir zufällig und ohne Rücksicht auf das Geschlecht 3 Paare bilden. Die Auszahlung der drei Paare erfolgt dann gemäß der "vom Onkel" bestimmten Regeln. D.h. nur wenn die "Paarung" passt, wird das Geld an die Teilnehmer ausgeschüttet.

Sie haben aber noch eine weitere Gewinnchance, wenn Sie über eine gute Prognosefähigkeit verfügen. Sie sollen nämlich auch das typische Verhalten der Teilnehmer möglichst zutreffend voraussagen. Von allen Einsendungen, deren Vorhersage zutrifft, werden drei

ausgelost und mit einem Preis von jeweils 500 Mark prämiert. Insgesamt schütten wir also bis zu 4500 Mark aus. Jede(r) Teilnehmer(in) muss sowohl in der Rolle der Charlotte als auch des Friedrich entscheiden, da die Rollen zufällig zugeordnet werden. Ihre entsprechenden Entscheidungen tragen Sie in die linke Spalte ihres Formulars ein. Den jeweiligen Rest soll Friedrich erhalten. Als Friedrich müssen Sie daher nur ankreuzen, welches der möglichen Angebote von Charlotte Sie annehmen oder ablehnen wollen. Ihre Vermutung über das häufigste Verhalten der Teilnehmer in der Rolle der Charlotte und des Friedrich tragen Sie entsprechend auf der rechten Seite des Formulars ein. (bil.)

Appendix B: Newspaper decision form

Entscheidungsformular

IHRE ENTSCHEIDUNG ALS CHARLOTTE

Als Charlotte verlange ich für mich
DM _____

Wieviel werden die meisten anderen Teilnehmer in der Rolle der Charlotte fordern? DM _____

[In der linken und rechten Spalte bitte nur jeweils einmal eine der 9 möglichen Forderungen (DM 100, 200, 300, 400, 500, 600, 700, 800 oder 900 eintragen!]

IHRE ENTSCHEIDUNG ALS FRIEDRICH

Charlotte bietet Ihnen	Ihre Reaktion als Friedrich	Wie werden sich die meisten anderen Teilnehmer in der Rolle von Friedrich entscheiden?
100 DM (d.h., Charlotte behält 900 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
200 DM (d.h., Charlotte behält 800 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
300 DM (d.h., Charlotte behält 700 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
400 DM (d.h., Charlotte behält 600 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
500 DM (d.h., Charlotte behält 500 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
600 DM (d.h., Charlotte behält 400 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
700 DM (d.h., Charlotte behält 300 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
800 DM (d.h., Charlotte behält 200 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>
900 DM (d.h., Charlotte behält 100 DM)	<input type="radio"/> annehmen/ablehnen <input type="radio"/>	<input type="radio"/> annehmen/ablehnen <input type="radio"/>

[In der linken und rechten Spalte bitte in allen 9 Zeilen entweder „annehmen“ oder „ablehnen“ ankreuzen!]

Teilnahmebedingungen

Füllen Sie bitte das Entscheidungsformular vollständig aus und senden es an: Humboldt-Universität zu Berlin, Institut für Wirtschaftstheorie III, Stichwort Gewinnspiel, Spandauer Str. 1, D-10178 Berlin oder per FAX an 030-20935704. Alternativ kann der Entscheidungsbogen im Internet unter www.berliner-zeitung.de/Wirtschaftstheorie ausgefüllt werden. Eine Einsendung des Fragebogens per Email ist nicht möglich. Unvollständig ausgefüllte Entscheidungsformulare werden nicht berücksichtigt. Jede Person darf nur einen Entscheidungsbogen einsenden. Einsendeschluss ist der 18.5.2001. Die Gewinner werden von der Redaktion schriftlich benachrichtigt. Mitarbeiter der Berliner Zeitung und des Instituts für Wirtschaftstheorie III der Humboldt-Universität zu Berlin sind von der Teilnahme ausgeschlossen. Der Rechtsweg ist ausgeschlossen.

Absender

Name _____

Straße _____ PLZ _____ Ort _____