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- Ultimatum bargaining in the loss domain -

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When proposers demand less without need*
– Ultimatum bargaining in the loss domain –

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Abstract

Subjects in the loss domain tend to split payoffs equally when bargaining. The ultimatum game offers an ideal mechanism through which economists can investigate whether equal splits are the consequence of proposer generosity or due to their anticipation that the responders will reject lower offers. This paper experimentally compares ultimatum bargaining in a loss domain with that under gains. The results reveal that, although responders do not expect more in the loss domain, proposers do make higher offers. As such, proposers reach agreements more often in the loss domain than they do in the gains domain, and responders receive higher payoffs.

Keywords:

Ultimatum bargaining, losses, equal split, experimental economics

JEL classification:

C72, C92, D74

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1 Introduction

In the last century, the western world witnessed a steady increase in wealth accompanied by high inflation. As a consequence, the amount of money in circulation steadily increased, and entrepreneurs and politicians often bargained over gains. With the dawn of the new century, the situation began to change. In the face of recession, struggling enterprises and nations increasingly bargained over losses. However, despite this shift, studies that investigate bargaining over losses remain scarce. This paper presents an experimental analysis in which the ultimatum game is employed to compare the outcomes of negotiations that take place in the loss domain with negotiations in the gains domain.

The ultimatum game embodies one of the simplest forms of bargaining. One player, the proposer, receives a pie and distributes it between himself and the second player, the responder (Güth et al. 1982). The responder then decides whether to accept or reject the distribution. In the event of the latter, both players receive nothing. In the sub-game perfect equilibrium of the ultimatum game, the responder accepts every distribution that pays marginally more than nothing. Expecting this, the proposer maximizes his own share by allocating the smallest realizable share to the responder. Experimentally, this result does not occur frequently (see, for example, Güth, 1995). Instead, a large fraction of proposers chooses to play an equal split, while distributions that result in the responder receiving less than 40% of the pie are frequently rejected.

Recent research on unstructured bargaining, i.e., bargaining situations in which both players simultaneously make their offers and chat with the bargaining partner prior to their offer (Kroll et al. 2014), indicates that equal splits are the most common methods of distribution in the loss domain, even in situations in which one party has a higher bargaining power than the other. This paper investigates whether this phenomenon is replicated in the ultimatum game. The results reveal that outcomes that are close to equal splits are more likely to be observed in the loss domain than they are in the gains domain. This paper argues that equal splits are the consequence of a change in proposer behavior. Proposers make lower demands when placed in positions of loss than they do when bargaining over gains. However, this is not the result of responders demanding a bigger share; in fact, responder behavior does not change.

The remainder of this paper is structured as follows: Section 2 briefly introduces the experiment, Section 3 presents the results of the investigation and Section 4 discusses the implications of these observations.

2 The experiment

We played the ultimatum game (Güth et al. 1982) using the strategy method (Brandts & Charness, 2011) with two players: proposer and responder. The proposer distributed a pie of size, s, by choosing how much of the pie, a, he wanted to keep for himself and, thus, how much the responder received, $s - a$. Simultaneously, the responder specified the maximum share, b, the proposer could withhold. If the responder accepted the proposer's offer, i.e., if it was within the share the responder was willing to concede ($a \leq b$), the proposer received a and the responder received $s - a$. Otherwise, both players received nothing.

2.1 Experimental procedure

We recruited the subjects using ORSEE (Greiner, 2015). Two days prior to the experiment, all subjects received a show up fee of 12.50 € and signed a receipt to confirm payment.

On the day of the experiment, we randomly assigned the subjects to seats in the laboratory and distributed experimental instructions. The subjects then played two rounds of the ultimatum game (see Section 2.2), of which one was randomly chosen and paid off.

The experiment lasted approximately one hour, and the subjects received an average payoff of 11.95 € (minimum: 3.35 €; maximum: 21.28 €). Those subjects who did not show up on the day of the experiment repaid the attendance fee of 12.50 €.

2.2 Treatments

To allow comparison between gains and losses, we introduced two treatments: gains and losses. In the gains treatment, the subjects played the ultimatum game as described above. In the losses treatment, we subtracted 10.00 € from the final payoffs. Hence, the payoffs in the gains treatment varied from 0.00 € to 10.00 €, while in the losses treatment the payoffs varied from -10.00 € to 0.00 €.

All subjects participated in both treatments; however, we varied the order of the treatments; half of the subjects played the gains treatment and half the losses treatment first. To ensure reciprocity between the subjects did not bias results, we only informed the subjects at the beginning of the experiment that they would play two treatments, the treatment to be paid off would be chosen by coin toss. However, the subjects received no information about the type of the second treatment. In addition, we focus our analysis purely on the first treatment the subjects played. As such, we realized real losses, and ensured that the subjects accepted the losses without any selection effects. Simultaneously, subjects in both treatments had identical expected payoffs.

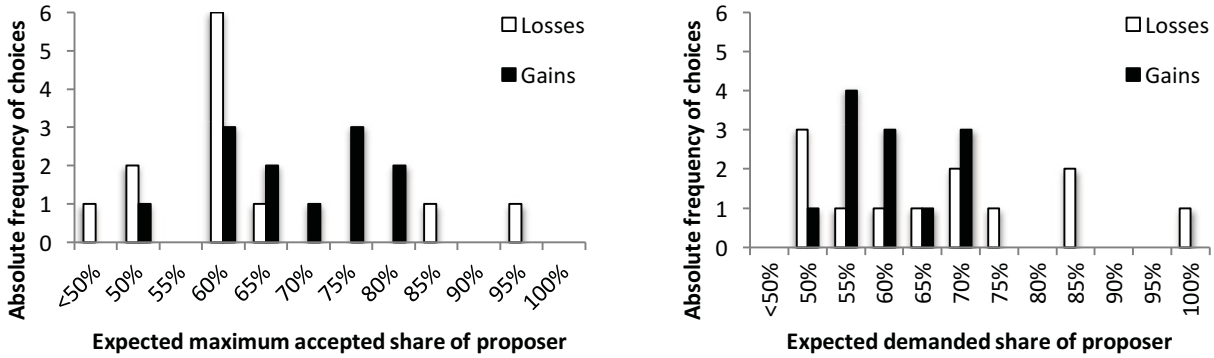
3 Results

In the losses treatment, the proposers demanded only 59% of the pie on average, while they demanded 67% in the gains treatment (see Table 1 and Table A.1 for individual data). As such, the demand of the proposers was significantly lower in the losses treatment (Mann-Whitney-U test, two-sided, p = 0.033). However, the proposers' expectation of the maximum demand the responders would be willing to accept (Figure 1), did not differ significantly (Mann-Whitney-U, two-sided, p = 0.128).

		Gains		Losses	
		Proposer	Responder	Proposer	Responder
Decision	**Mean**	67%	67%	59%	67%
	SD	9%	14%	12%	16%
Belief	**Mean**	68%	60%	59%	68%
	SD	9%	7%	23%	16%

Table 1: Average decisions and beliefs of proposers and responders

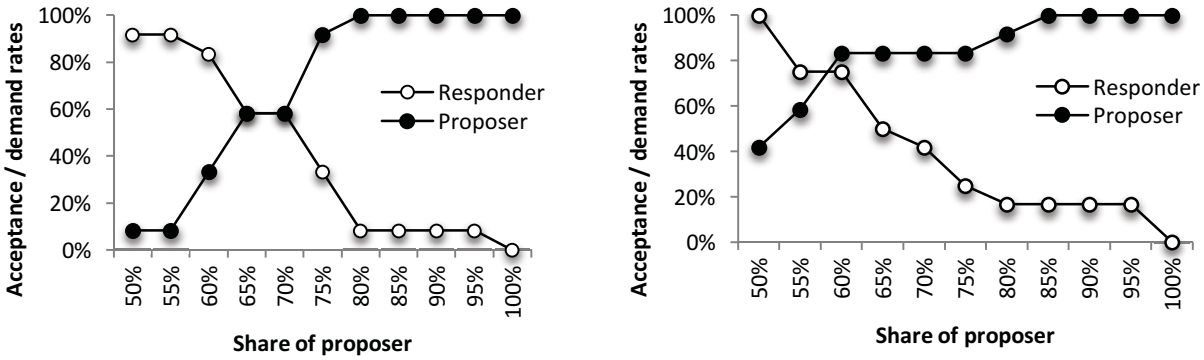
The responders did not anticipate this behavior. Neither their beliefs (Mann-Whitney-U test, two-sided, p = 0.671) nor their decisions (Mann-Whitney-U, two-sided, p = 0.347) varied between treatments.



(a) Beliefs of proposers **(b) Beliefs of responders**

Figure 1: Beliefs concerning the behavior of the other subject

A visualization of the cumulative fraction of demands of proposers and accepted shares of responders confirmed the results shown in the aggregates (see Figure 2). For both gains and losses, the vast majority of responders rejected any demand higher than 80%, and the fraction of responders accepting the demand slowly decreased between a demand of 50% and 80%. However, the cumulative fraction of proposers making certain demands differed between the gains and losses treatment. During the losses treatment, 80% of all proposers made demands of 60% or lower. During the gains treatment, this fraction was first reached when 75% or lower of the pie was offered.



(a) Gains **(b) Losses**

Figure 2: Cumulative acceptance of responders and demand of proposers

When every proposer per treatment is matched with every responder, it becomes apparent that, in the losses treatment, 76% of the matches came to an agreement, while in the gains treatment only 55% agreed (see Table 2). As such, as proposers in the losses treatment demand a lower fraction of the pie, the payoffs the responders receive are, on average, higher in the losses treatment than they are in the gains treatment (Mann-Whitney-U test, two-sided, p = 0.002). However, the responders did not come to an agreement more often in the losses treatment than they did in the gains treatment (Mann-Whitney-U test, two-sided, p = 0.219). The proposers, on the other hand, reached agreements more often in the losses

treatment (Mann-Whitney-U test, two-sided, p = 0.089) without yielding higher payoffs (Mann-Whitney-U test, two-sided, p = 0.198).

Finally, the difference between the demand of the proposer and the maximum accepted share of the responder was higher in the losses treatment for the proposer than it was in the gains treatment (Mann-Whitney-U test, two-sided, p = 0.091).

	Agree-ment	Proposer		Responder	
		Mean	SD	Mean	SD
Gains	55%	35%	14%	20%	11%
Losses	76%	41%	13%	34%	8%

Table 2: Average payoffs per player

4 Discussion

The outcomes of the study revealed treatment differences between gains and losses. While the responders did not adapt their behavior in response to the threat of losses, the proposers did. The proposers demanded less when facing losses and reached an agreement with the responders more frequently. As such, the payoffs responders receive are higher under losses than they are under gains.

This result is interesting when viewed in light of recent events in Greece. Shortly after the election of Tsipras and Varoufakis, the bargaining relationship between the Greek government and the troika shifted from unstructured to ultimatum. Sziriza began to propose distributions of potential losses between their money lenders and themselves. The money lenders decided whether to accept the distributions. The results of this study indicate that there is a higher probability that subjects will reach an agreement for losses than for gains; as such, the proposer has to increase his offer. However, this has not occurred in the case of Greece. Sziriza insists on maintaining the promises it made before the election and, subsequently, loses any benefits it could gain from bargaining in the loss domain.

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Appendix: Experimental data

	Gains		Losses	
ID	**Proposer**	**Responder**	**Proposer**	**Responder**
1	60% (0%)	55% (0%)	85% (0%)	70% (5%)
2	65% (0%)	75% (5%)	60% (-5%)	95% (10%)
3	80% (0%)	95% (35%)	60% (0%)	60% (5%)
4	75% (0%)	70% (10%)	55% (-5%)	50% (0%)
5	75% (0%)	60% (10%)	50% (0%)	50% (-50%)
6	65% (-5%)	70% (15%)	50% (0%)	65% (-20%)
7	75% (-5%)	40% (-20%)	50% (-10%)	95% (20%)
8	75% (0%)	75% (5%)	50% (50%)	75% (5%)
9	60% (-5%)	75% (20%)	80% (-15%)	60% (0%)
10	60% (0%)	60% (5%)	60% (0%)	50% (-20%)
11	65% (15%)	70% (5%)	50% (-10%)	70% (20%)
12	50% (-10%)	60% (-10%)	55% (-5%)	60% (10%)
Avg.	67% (-1%)	67% (7%)	59% (0%)	67% (-1%)

Table A.1: Proposer and responder decisions as fraction of pie kept by proposer and deviations to beliefs (in brackets)

Notes:
Some proposers demand less than they expect the responder to accept (negative deviations in brackets) and some responders accept higher demands than they expect from the proposer (positive deviation in brackets). Such behavior was expected: The difference is a risk premium to ensure agreement. Surprisingly, some proposers offer less than they expect the responder to accept, and some responders only accept more than they expect the proposer to offer. In post-game inquiries, subjects revealed an inclination to punish "unfair" behavior by refusing to reach an agreement.

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