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Discussion paper

Negotiation under possible third party settlement

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Negotiation under possible third party settlement*

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Abstract

The effect of possible third party settlement on negotiation behaviour is studied in an economic bargaining experiment. The bargaining phase is preceded by a production phase that allows for different fairness principles to guide the division of the total production value. The experimental results show that a possible third party settlement lowers the dispute costs by reducing the number of rounds of alternating offers. In the presence of a third party, negotiators make first offers that are more strongly related to their production, which reduces the number of rounds of bargaining. The production phase has an effect on the distributional property of the settlements. In negotiations where third party settlement is an option, the negotiation outcome shifts towards a more unequal outcome, more in line with each person's contribution.

Keywords: Arbitration; Bargaining efficiency; Experiment

JEL classification: C78; D63; J52

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1 Introduction

Many decisions are reached in negotiations under the fall back of a third party settlement. Civil disputes can be brought to court, disputes arising under commercial contracts may be solved by arbitration proceedings, and conflicts between branch managers can be decided by a senior manager. The main question addressed in this paper is to what extent the possibility of submitting a case to an impartial third party for settlement influences the bargaining efficiency and the distributional properties of the settlements. The effects are studied in a laboratory experiment with business school students. The negotiations studied in this paper are such that two parties must agree upon the division of a sum of money created through individually produced output. The bargaining process is costly and may go on until no money is left on the table. I compare negotiations with and without the option to unilaterally submit the case to an impartial third party. There are three possible outcomes in the game: an agreement about a division of the money, a final third party settlement, or a perpetual disagreement. The game studied is based on the alternating offer bargaining protocol extended to include the outside option of using a third party to make a final decision.

Experimental studies of sequential bargaining show that concerns for fairness influence bargaining behaviour (Ochs and Roth, 1989; Weg, Rapoport, and Felsenthal, 1990; Bruyn and Bolton, 2008). In these experiments the players are asked to negotiate the division of a fixed amount of money over a few rounds of offers. The experimenter induces differences in the individual discount rates which, according to the standard model, should give an unequal division of the money. The experimental results show, however, that players tend to favour an equal distribution of money. Even in experimental situations where one of the negotiators has all the bargaining power (dictator game), a third of the participants typically divide equally (Camerer, 2003). The strong tendency for an equal split in these bargaining contexts may be driven by the widely accepted fairness principle of an equal split when no entitlement to the money exists. The experiment reported in this paper is designed to create different entitlements to the endowment through a real effort production phase before negotiations take place. The experimental results show that a player with a higher production gets on average a larger share of the money. In the presence of a third party, the distributional property of the settlements shifts towards a more unequal outcome that is more in line with each person's contribution.

Experimental studies of arbitration typically find that dispute rates more than double when conventional arbitration is introduced into negotiations (Ashenfelter, Currie, Farber, and Spiegel, 1992; Bolton and Katok, 1998; Charness, 2000; Dickinson, 2004).¹ In the experiment reported here the introduction of an option to let a third party decide significantly lowers the dispute costs by reducing the

¹With the exception of Charness (2000), these other studies do not apply the alternating offer protocol and the negotiation process is not costly, but money is lost in the case of disagreement.

number of rounds of alternating offers. The reduction in the number of rounds of bargaining can be explained by negotiators making first offers that are more strongly related to their production when in the presence of a third party. The introduction of a third party therefore influences both the efficiency and the distributional properties of negotiations.

More details of the experimental design are presented in Section 2. Section 3 contains a theoretical analysis based on standard bargaining models. The experimental results are discussed in Section 4, and the relation to the experimental bargaining literature is provided in Section 5. Some concluding remarks are given in Section 6.

2 Experimental design

The experiment contains four phases: a production phase, a dictator phase, a negotiation phase, and a question phase. Participants are provided with the basic design of all four phases at the beginning of the experiment (complete instructions are provided in an online supplement). There are two experimental treatments, and the participants are randomly selected into one of the two treatments. Those that act as third parties are also randomly selected among the participants. Third parties do not participate in the production or dictator phase in order to not bias their view. Instead, they spend their time answering questions on four hypothetical cases that are similar in structure and information to the real cases that they meet later in the experiment.

In the dictator and negotiation phases, the participants are randomly matched in pairs and each person is involved in four situations in the dictator game and four negotiations. Pairs are rematched between each situation. Participants in each session are randomly seated in separate cubicles; all interaction between participants is anonymous and made through a web interface developed for the experiment (selected screenshots are provided in an online supplement).²

Payment in the experiment is determined for each participant by a random draw from the four situations in the dictator phase or the four situations in the negotiation phase that the participant has been involved in. The participant is paid according to the result he or she achieved in the situation that is drawn. If there is a third party involvement, the participant is paid according to the third party decision net of third party costs. A third party is paid a fixed amount of compensation by the experimenter, independent of his or her choices in the experiment or whether the service is used at all. In many third party institutions

¹‘Dispute rates’ refers to the fraction of bargains where no agreements have been made after a fixed time period.

²The experiment is programmed in Python, and uses a MySQL database and an Apache web server application. The experiment is run on laptop computers that communicate over a wireless local area network.

such as commercial arbitration, a third party is normally paid by the parties for the time used to settle the dispute. The choice of a fixed sum communicated to the third parties upfront was made in order to make incentives clear and unbiased with respect to the uncertain demand for their service in the experiment. At the end of the experiment, each participant is asked to complete a form using a code given on the screen and the payment attached to that code is transferred to the participant's bank account. Matching of the receivables and the bank account details is done by a person outside the research group who has no other information about the experiment.

In the *production* phase of the experiment all negotiators produce individually an output by copying text for 10 minutes on the computer. The production phase has been designed to create individual entitlements to the money. Individual production is rounded off to the nearest 50 correct words typed. Individual i 's production value y_i is equal to $e_i p_i$, where the number of words typed is e_i , and the price p_i is either NOK 0.75 or 1.50 per correct word.³ The prices are randomly distributed to players by the experimenter after typing has ended.⁴ The total production value to be divided in a negotiation is equal to $Y = y_1 + y_2$.

There are at least three salient fairness principles, m^n where $n = E, L, P$, which can guide the individual in dividing the total production value. The first principle is strict *equality* which is simply an equal split of the joint production value, $m^E = Y/2$. The second principle is a *laissez-faire* principle which gives each individual what he earns in the production $m^L = e_i p_i$, and the third principle is a *proportionality* principle which allocates the joint production according to the relative production of words such that individual i gets $m^P = (e_i/(e_1 + e_2))Y$. A principle of proportionality under which the input–output ratio is equal between people is often called the equity principle or the accountability principle (Konow, 1996). It is a widely held principle, especially in contexts of production (Konow, 2000).

In the *dictator* phase of the experiment, participants are randomly matched in pairs and one participant is chosen to act as a dictator who decides on the division of the production value, Y , between the two. The participant acting as a dictator is given full information about both participants' production of words and the randomly assigned prices. Each participant is involved in a total of four dictator situations, two as a dictator and two as a passive receiver, all randomly matched pairs. The dictator game represents a situation comparable to negotiations where one of the players has all the bargaining power and there is no strategic element to the distributive choice. Information from the dictator situations is used to explain behaviour in the negotiations.

³At the time of the experiment USD/NOK = 6.9

⁴Before the production phase all participants are told that they will earn money according to the number of correct words that they type, but that the payoff from the experiment will depend on the subsequent phases. To avoid incentive effects, prices are assigned after the production.

In the *negotiation* phase of the experiment, participants are again randomly matched in pairs and they are instructed to bargain over the division of the production value, Y . The bargaining protocol is an alternating offer bargaining with infinite horizon.⁵ Both participants are induced with an equal discount factor, $\delta = 0.96$, such that the value of the production shrinks by the same amount for both negotiators. Money at the negotiation table in round t is equal to $\delta^{t-1}Y$. One of the participants in a pair is randomly assigned as the first mover and proposes an opening offer in the first round, $t = 1$. An offer from individual i is an amount of money x_i to himself and $Y - x_i$, to the other party. In treatment I, called the *bargaining* treatment, the second mover responds to an initial offer either by accepting it and the negotiation is closed without cost, or by making a counteroffer in the second round ($t = 2$) where the production value is reduced by 4%. The negotiation is closed when one party accepts an offer.⁶ The pairs of participants are rematched between each negotiation and all players take part in four negotiations. Participants are given full information about the other participants' production of words and the prices assigned to each in the bargaining pair. Every offer that is made during the negotiation is recorded in a table on the screen. Communication between parties is restricted to this minimal exchange of suggested divisions of the total production value, and acceptance or rejection of the other's offer.

In treatment II, called the *third party* treatment, the bargaining protocol is changed such that there is an additional option available during the alternating offers. This is to unilaterally break off the negotiation and request a third party settlement. Because this extra third party option is only available in the second treatment and there is random assignment of participants to the two treatments, the experimental design allows us to study the causal effect of introducing a third party option. Using a third party costs each negotiator 5%. The cost is independent of who made the request for the third party settlement. There are no restrictions on the settlement imposed by the third party other than it has to be equal to the available sum of money, so that no money can be added or withdrawn. The third party called upon to make a decision is given all the relevant information about the negotiation, that is, both negotiators' production of words, the assigned prices, and the full sequence of offers made by both negotiators including who asked for the third party service. Negotiators are not given

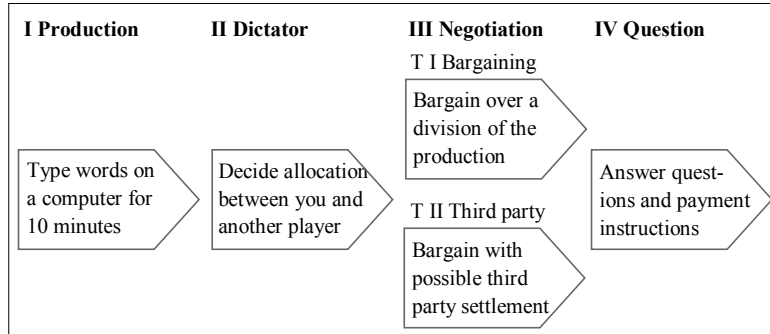
⁵In principle, the negotiations could continue until the minimum offer of NOK 1 is reached or the participants could use an excessively long time to decide in each round, never concluding the negotiation. From previous experience with experiments of this kind, we thought these events so unlikely that the participants were not informed of how such situations would be handled. One negotiation lasted for 26 rounds ending with an equal split of the remaining 0.36% of the production. It took 22 minutes to complete this negotiation.

⁶Every time a choice has been made, participants are informed about the consequences of their choice, and they are asked whether they would like to revise it before it is transmitted to the other party.

information about any decisions made by third parties during the experiment.

After all choices are made, the participants are given three questions about bargaining and fairness (questions can be found in an online supplement). Figure 1 shows the different phases and the two treatments of the experiment for the negotiators.

Figure 1: Experimental design for negotiators



Beliefs about the potential outcomes of the negotiations and the third party decisions are elicited during the experiment. This allows for checking whether the outcomes are affected by mistaken beliefs about the outcome of negotiations, for example whether the use of a third party is driven by mistaken beliefs about the third party decision. Before the first mover sends the initial offer, he is asked what he believes will be the outcome of the bargaining. The first mover receives a bonus of NOK 20 if the guess is within a NOK 20 deviation of the actual agreement made.⁷ In all cases where a third party settlement is requested, the participant who requests the third party settlement is asked what he thinks is the most likely outcome. Participants are paid a bonus of NOK 20 if the answer is within a NOK 20 deviation of the actual decision made by the third party.

The experiment took place at the Norwegian School of Economics and Business Administration in October 2008. Students from the first and second years of the Master of Science programme in Economics and Business Administration were invited to participate in an experiment. The invitation explained that the experiment was voluntary, that they would receive NOK 100 for participating, and that they would possibly earn more money during the experiment. A total of 110 students volunteered to participate and they were randomly assigned to one of six sessions, three sessions for each treatment. There were 28 bargaining pairs in the pure negotiation treatment and 24 bargaining pairs in the third party treatment. The 104 negotiators were paid an average of NOK 333 (USD 48.3) for an experiment that lasted on average an hour and a half. The maximum

⁷To avoid any strategic behaviour with respect to final offers and the bonus payment, it is made explicit in the instructions that a negotiator will not receive the bonus if that particular situation is drawn for payment.

payment any student received was NOK 600. For the third party treatment, six of the students were randomly selected to act as a third party. Third parties were paid a fixed compensation of NOK 300.

3 Theoretical analysis

This section discusses what the expected difference between the two treatments should be based on standard models of bargaining behaviour. The negotiation protocol used in the experiment is based on an alternating offer model with an infinite horizon that has a unique sub-game perfect equilibrium outcome (Rubinstein, 1982). In the absence of a third party decision, the model predicts the first mover will offer $\delta/(1 + \delta)$ to the other player, who should accept. In the experiment, δ is induced to be 0.96 for both players. The first mover should therefore offer 0.49 to the other participant, who should then accept. A low discount rate of 4% is chosen in order to reduce the first mover advantage. The Rubinstein model predicts an outcome of the negotiations close to an equal split with no variation. An agreement made in the first round is costless and efficient. The model is based on both players having standard preferences, which are common knowledge among the players. For small payoffs the utility function can be assumed to be linear in payoffs representing risk neutrality. The production phase does not enter into the model, which is based on a given endowment to negotiate over.

The influence of a third party on the negotiations will depend upon the rules that govern the third party mechanism and the assumptions about the third party behaviour. Here, negotiators can unilaterally submit the case for a binding third party decision in any round during the negotiations. A third party can implement any settlement of the contested amount, but he cannot add or subtract money. There are different hypotheses about how impartial third parties reach decisions. Many papers on arbitration assume that the arbitrator will compromise the final positions of the negotiators. Negotiators will in such a situation tend to make large demands and small concessions in order to offset the compromise decision of the arbitrator. Such behaviour would predict increased dispute rates in negotiations under a possible third party settlement. On the other hand, if a third party follows a fairness principle in the allocation decision, the effect on dispute rates may be different. Among the papers that study arbitrator behaviour empirically, mostly in labour disputes, Bazerman (1985) finds that arbitrators consistently apply principles in the decisions across different cases, and that there is variation among arbitrators in which principle they apply, while Bloom (1986) finds more evidence of compromising behaviour among arbitrators.

Submitting the case to a third party for settlement is an outside option. In situations where negotiators know with certainty what principle the third party will use, a rational negotiator with standard preferences should submit the case

for a third party decision when the payoff from a third party settlement net of costs is greater than the payoff that would be the outcome of a negotiation. Because the Rubinstein model predicts an almost equal split, the outside option will be an empty threat for both players if it is common knowledge that the third party follows an *egalitarian* principle. This is because of the cost of using a third party. Hence, if the Rubinstein model predicts correctly the behaviour of the players, there should be no difference between the treatments; all negotiations should end in the first round with an equal split of the money.

If the third party is known to follow either a *proportionality* or a *laissez-faire* principle, the outcome will depend upon the application of these principles in the specific situation facing the negotiators in the experiment. In a few cases the production and the price are the same for both negotiators, and an application of any of the fairness principles will then lead to the same answer—an equal split. However, in most situations where there are differences in the number of words produced or the prices assigned, the application of these principles gives more money to one of the parties. This party could then use this as a credible threat to get more money out of the negotiation. The other party should recognize the credible threat and agree on a settlement that follows the principle of the third party. Hence, if both negotiators know that the third party follows a *proportionality* or *laissez-faire* principle, we should expect differences between the treatments. The distributional properties of the bargaining outcome should on average be more unequal, reflecting the fact that self-interested negotiators have a credible outside option threat.

If there is uncertainty about the third party decision then the negotiators would take this into account. There is an expected gain from submitting the case to a third party if the expected outcome net of cost is higher than the outcome from a bargaining agreement. Uncertainty about third party principles should not in itself change the conclusion about the expected differences between the treatments.

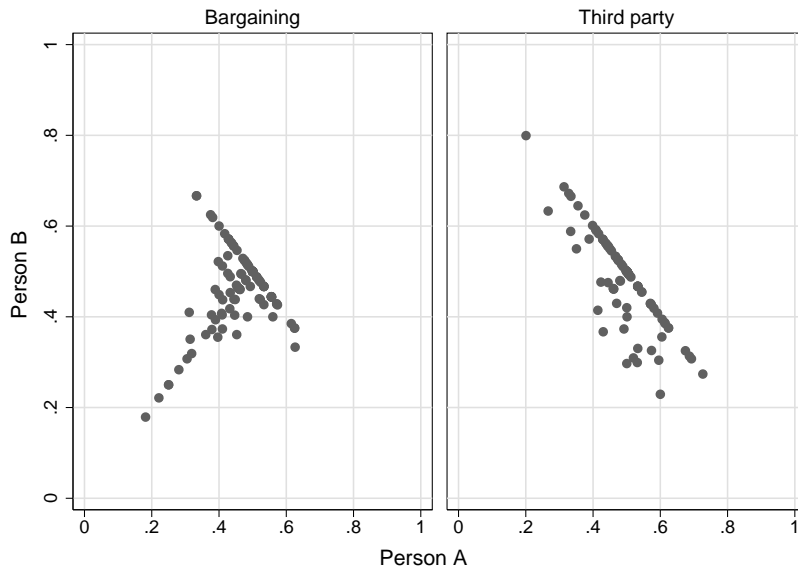
Rational negotiators with perfect information should agree in the first round, independently of their preferences and the presence or absence of a third party. An agreement in the first round is Pareto efficient. A third party may influence the distribution of the negotiation outcome, but he should not influence bargaining efficiency. Third party arbitration is a costly mechanism; the threat of using it should be sufficient to influence the outcome and no actual use should therefore be observed. However, in many experiments negotiators use multiple rounds of offers and counteroffers to reach an agreement. Such inefficiencies in negotiations could arise from bounded rationality and uncertainty. The Rubinstein (1982) solution relies on rationality in the sense that the parties should be able to solve the problem using backward deduction. It is however well known that participants in experiments, for example the centipede game, fail in the use of backward deduction logic (Camerer, 2003). Uncertainty with respect to the other players' preferences or motives could also create more rounds of negotiations be-

cause negotiators use costly delays to signal to the other party information about their own reservation value (Ochs and Roth, 1989). Because participants are randomly assigned to the two treatments, bounded rationality and signalling are not expected to cause differences in efficiency between the treatments.

4 Experimental results

The experimental results show that both the bargaining efficiency and the distributional properties of the outcome are influenced by the introduction of a possible third party settlement. The 208 negotiations are summarized for the two treatments in Figure 2. Each point on the graph on the left represents an agreement from the bargaining treatment with person A's share of the total production value on the horizontal axis and person B's share on the vertical axis. Each point on the graph on the right represents a settlement from the treatment with an option to submit the case to a third party, including 15 actual third party decisions. All the points along the diagonal line from the upper left corner to lower right corner represent efficient agreements, i.e. agreements made without costs. All the points that are placed inside this efficiency frontier represent settlements where some of the production value is lost during negotiation or by the use of a third party. We can immediately observe that more settlements from the bargaining treatment are further away from the efficient frontier, indicating a difference in efficiency between the treatments.

Figure 2: Share of total production value



Almost half of all the settlements are equal splits.⁸ There is a difference between the treatments: 56% of the settlements in the bargaining treatment are equal splits compared with 34% of the settlements in the third party treatment. There is also a significant increase in the variance of the share that person A receives in the third party treatment ($p < 0.001$, Levene’s test). The most extreme unequal split is a 20–80 split from the third party treatment.⁹

4.1 Efficiency in reaching an agreement

Efficiency in reaching an agreement is measured in terms of the reduction in the production value and actual use of a third party. Dispute cost, c , in the cases where no third party is used, is equal to one minus the accumulated reduction in value from the discount factor ($c = 1 - \delta^{t-1}$, where t is the number of rounds at the close of an agreement). In the cases where a third party is used, dispute costs are also adjusted for the third party cost, α , of 10% ($c = 1 - \delta^{t-1}(1 - \alpha)$). If the second mover accepts the initial offer in the first round, there will be no dispute cost.

Table 1: Efficiency of settlements by treatment

		I: Bargaining	II: Third party
Rounds	average	3.29	1.33
	std. dev.	(4.41)	(0.75)
Dispute costs	average	0.08	0.03
	std. dev.	(0.13)	(0.05)
n		112	96

Table 1 shows that dispute costs are significantly reduced from 8% to 3% in the third party treatment ($p = 0.004$, Wilcoxon rank-sum test). The average number of rounds in the third party treatment is 1.3, which is significantly lower than 3.3 in the bargaining treatment ($p < 0.001$, Wilcoxon rank-sum test). In the bargaining treatment, about 20% of the negotiations continue for five rounds or more; see Figure 3.

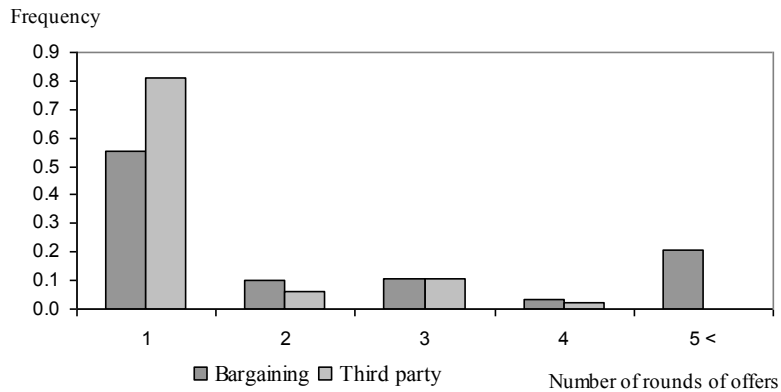
The results show that there is a significant improvement in efficiency by making available an option to submit the case to a third party. This is in contrast

⁸In order to accommodate rounding to the nearest NOK 5 and the small first mover advantage that follows from a theoretical solution, all agreements within a 47.5–52.5 split are characterized as equal splits. Forty-six per cent of the settlements are within this bound.

⁹The average split is close to 50–50 for both treatments. Because of the random selection of pairs in the experiment, a consistent application of any of the principles discussed in Section 3 gives an average of 0.5, but with different variance. The distributional properties of the agreements are further discussed in Section 4.3.

with previous experimental studies that find an increase in dispute rates when a third party is introduced (Ashenfelter et al., 1992; Bolton and Katok, 1998; Charness, 2000; Dickinson, 2004). These studies typically find that dispute rates more than double when conventional arbitration is introduced. (There are some differences in experimental design between these papers that can possibly explain the different dispute rates; this is discussed in Section 5.)

Figure 3: Rounds of offers in the two treatments



The first offer is important for the negotiations because it sends a signal about the preferred outcome and the aggressiveness of the strategy that a negotiator will employ. The first offers could therefore have a strong impact on the efficiency of negotiations. The number of rounds that a negotiation takes to complete in the experiment is significantly correlated with the first offers ($p < 0.001$, Spearman rank-order correlation). The main explanation of the reduction in dispute costs is the sharp decrease in rejections of first offers when introducing a third party (45% versus 19%).

There is a notable difference in the average share that person A offers in the first round in the two treatments. The average share that person A offers in the first round is 8% higher for the third party treatment compared with the bargaining treatment, which is a statistically significant difference ($p = 0.10$, Wilcoxon rank-sum test). The higher offers in the first round, when there is an option to submit the case to a third party, indicate that there is a difference in the negotiation strategies employed in this treatment.

In Table 2 the first offer from person A is explained by his relative production in the pair, and his relative price in the pair. The coefficient for production would be equal to one if the outcome was proportional to the production of the negotiators, that is, if the proportionality principle was strictly applied in the first round. The parameters are estimated using data for the first round of offers by applying a regression with individual fixed effects. Production and price are significant explanatory variables in the third party treatment but not in the bargaining treatment, where the variables have very little explanatory power.

The introduction of a third party induces the parties to make first offers that are strongly related to their relative production. Offers that are more strongly related to production will be closer to an equal split on average because the experiment is based on a random matching of pairs with a different production of words. This can explain the increased average share that person one offers in the first round in the third party treatment.

Table 2: Effect of relative production and price on first offers

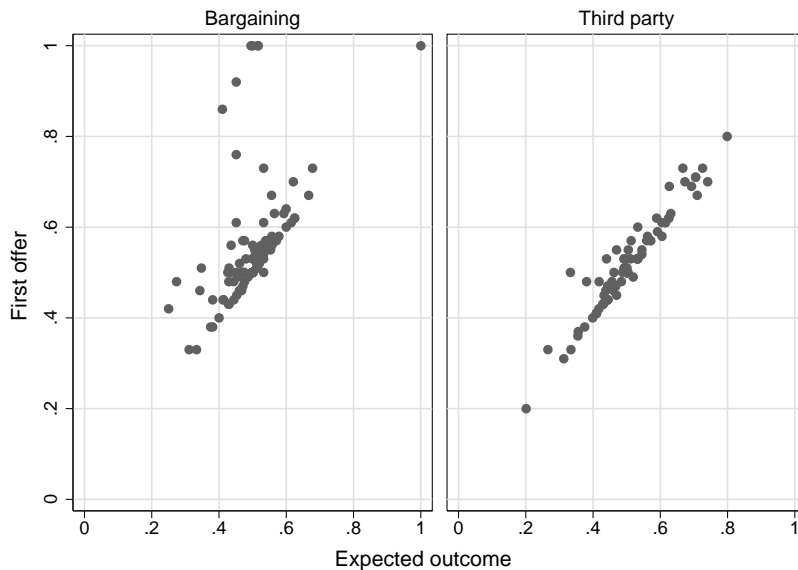
	T I: Bargaining	T II: Third party
Production	-0.079 (0.363)	0.732*** (0.083)
Price	0.047 (0.050)	0.063*** (0.014)
Constant	0.538** (0.215)	0.077* (0.046)
R^2	0.03	0.65
n	112	96/81

Notes. Standard errors in parentheses.***/**/*: 1/5/10% significance.
Regression with individual fixed effects.

Figure 4 shows that there is a strong correlation between what a person expects will be the outcome from the negotiation and that person's first offer. However, in the bargaining treatment, there are a number of observations where negotiators start out by claiming for themselves a much higher share in the first offer than they expect will be the outcome, which is not the case for the third party treatment. The presence of a third party induces negotiators to make first offers that are more in line with expectations.

There are five first offers of zero to person B in the negotiation phase of the experiment. All these first offers were made by negotiators who also offered zero in the dictator game. This indicates that there is consistent behaviour over the different phases of the experiment. A dummy variable is constructed in order to check whether the dictator results have predictive power in explaining the negotiation efficiency. The dummy variable is zero if both of the dictator decisions are at the same level or higher (by a margin of at least 0.025) than the lowest offer that follows from the application of any of the principles described in Section 2; otherwise the dummy variable has a value of one. About one-third of the negotiators make offers in the dictator game that are lower than what the most self-serving principle tells them to do. This dummy variable is significantly correlated with both dispute costs and first offers ($p < 0.001$, Spearman rank-order correlation). It seems that inefficiency in negotiations is related to specific

Figure 4: Correlation between expected outcome and first offer



types of players.¹⁰

4.2 Distributional properties of the outcome

The distributional properties of the settlements also differ between the two treatments, where there is more inequality in the third party treatment measured with the Gini index.¹¹ There is a significant increase in average inequality from 7% in the bargaining treatment to 12% in the third party treatment ($p = 0.008$, Wilcoxon rank-sum test). This excludes the 15 observations where a third party decided the settlement. If these observations are included, there is an even larger increase in the inequality.

The production phase of the experiment has explanatory power for the distributional properties of the negotiation outcome. In Table 3 the share that person A receives in the agreement is explained by his relative production in the pair, and his relative price in the pair. The effects are estimated by a regression with individual fixed effects. Both production and price are significant explanatory variables in the regressions. We see that the production coefficient is higher

¹⁰Charness (2000) finds that different types of negotiators are important for explaining differences in efficiency. He investigates the influence of social preferences in a bargaining experiment with screening of participants into two groups based on their generosity in a dictator game (giving more or less than 30%). The sorting of participants into bargaining pairs reduces overall dispute costs, primarily because of a reduction in these costs when two generous types are paired together.

¹¹The Gini index is zero for an equal split and one for a split where one player receives everything. The result is robust for other measures of inequality.

in the third party treatment, which indicates that there are more agreements closer to the proportionality principle in this treatment. However, a regression with an interaction term for production and treatment (the third column) shows that the importance of relative production is not statistically significant between treatments.

Table 3: Effect of relative production and price on agreements

	TI	TII	TI & TII
	Bargaining	Third party	Negotiation
Production	0.571*** (0.094)	0.696*** (0.113)	0.542*** (0.117)
Price	0.061*** (0.013)	0.048** (0.019)	0.054*** (0.011)
Prod. \times treat.			0.156 (0.147)
Constant	0.149*** (0.055)	0.102 (0.062)	0.136*** (0.044)
R^2	0.418	0.45	0.439
n	112	96	208

Notes. Standard errors in parentheses.***/**/*: 1/5/10% significance
Regression with individual fixed effects.

Before person A chooses a first offer, he is asked about the amount of money he expects to end up with in the agreement. There is no significant difference between the treatments in the expected outcome. However, the inequality of the expected agreement in the bargaining treatment is 11%, significantly higher than the 7% for the actual agreements in that treatment ($p < 0.001$, Wilcoxon signed-rank test). It seems that the negotiators do not fully expect the more equal distribution in the bargaining treatment. For the third party treatment there is no statistically significant difference between the average expected outcome and the average actual outcome.

The dictator game results show that the participants to a large extent also chose to divide the production value according to each person's contribution when they had all the bargaining power. The coefficient estimate for production is 0.8 in Table 4, which indicates that offers are made close to the proportionality principle.¹²

¹²On average the participants offer 39% of the total production to the other player in the dictator game. The average offer to the other person in this dictator game is higher than typical dictator games where the average offer is about 20% of dictator endowment (Camerer, 2003). The higher average offer in a context with a real effort production phase is in line with the results of Cappelen, Hole, Sørensen, and Tungodden (2007).

Table 4: Effect of relative production and price on dictator decisions

	Dictator
Production	0.802*** (0.135)
Price	0.052*** (0.019)
Constant	0.150* (0.077)
R^2	0.141
n	208

Notes. Standard errors in parentheses.

***/**/*: 1/5/10% significance.

4.3 Third party behaviour

In a questionnaire, all of the six participants who acted as third parties preferred the proportionality principle. Four of them also answered that they would consider the strategy of the negotiators in their evaluation, saying they would allocate less to negotiators that were offering less than what was reasonable. Two arbitrators said that they would follow a rule that deducted all the dispute cost from the one who had offered less than what they perceived as fair, reasoning that he was responsible for the dispute costs. Seven of the 15 third party decisions were settled close to an application of a proportionality principle, and the other eight seemed not to follow a strict interpretation of a principle. All the third parties considered their role as an impartial third party to be to find a fair solution, and only one mentioned that a third party mechanism may foster faster decisions and improved efficiency.

The hypothesis that the third party mechanically compromises the final offers is not supported by the data. The final offers seem to have little direct influence; only in four cases are the settlements close to one of the parties' final offers. There are seven cases of third party settlements outside of the final offer from the negotiators.

Incorrect beliefs about the third party behaviour, for example excessive optimism about the outcome of a third party award, could cause the use of an expensive third party mechanism that would not have been used if the beliefs were correct (Babcock and Loewenstein, 1997). In the experiment, the participant who requests the third party is asked about what he believes will be the decision of the third party. As only 15 cases here were decided by a third party, we should be cautious interpreting this data, but the average belief about the third party decision is not significantly different from what the third party actually

decides. More than half of the participants’ subjective beliefs are within a 10% deviation from the third party decisions, and there is no evidence of systematic deviation of the beliefs about the third party decision.

4.4 Negotiators’ answers to questionnaire

To understand what the participants think about fairness and bargaining, a short questionnaire was given to the negotiators after all the negotiations were completed. The first question given to the negotiators contains a brief description of a negotiation problem illustrated with three examples, similar to the actual cases that the participants experienced during the experiment. The answers show the largest support among the negotiators for the principle of *proportionality*, followed by the *laissez-faire* principle. Only 4% of the participants favour a strictly *egalitarian* division of the production value; see Table 5. These numbers seem to be biased by the actual experience during the experiment because the *proportionality* principle is favoured by 77% of those who participated in the third party treatment, and by only 57% of those who participated in the bargaining treatment, and there is a corresponding change in the support for the *laissez-faire* principle. The higher support for the *laissez-faire* principle in bargaining may reflect the self-serving use of such a principle during the bargaining treatment and a justification of this in the questionnaire.

Table 5: Preferred fairness principle

	I: Bargaining	II: Third party
Proportional to production	57%	77%
Laissez-faire principle	39%	19%
Equal division	4%	4%
n	56	48

The second question is related to whether they find it acceptable to use fairness or power in negotiations. The question is the same as that used by Binmore, Swierzbinski, Hsu, and Proulx (1993), who find that 35% say that one ought to play fair. Here, 57% of the negotiators in the pure bargaining treatment say that one ought to play fair compared with 69% of the negotiators in the third party treatment. The rest say that it is acceptable to use one’s bargaining power. The experimental design differs from that of Binmore et al. (1993), and the larger support for fair play is probably because of the inclusion of a real effort production phase.

The third question relates to the use of bargaining strategies. Negotiators are asked to rank four alternative strategies according to what they think is the most important in negotiations in order to reach an agreement where they achieve their own goals. The results show that having a strong opening position is given the

best overall rank; see Table 6. Although fairness is important in negotiations, players' views are more balanced when a fairness strategy is compared with other strategies.

Table 6: The importance of negotiation strategies

	Rank
A strong opening position	1
Seeking a fair outcome	2
More bargaining power	3
Willingness to make concessions	4
n	104

5 Related literature

This paper is related to several papers that study arbitration in an experimental setting (Ashenfelter et al., 1992; Bolton and Katok, 1998; Charness, 2000; Dickinson, 2004). They typically find that dispute rates more than double when conventional arbitration is introduced into negotiations. An innovative part of Ashenfelter et al. (1992) is the design where the arbitration decision is implemented as a computer random draw from a normal distribution with equal split of the outcome as the mean. A bargaining treatment is compared with an arbitration treatment. They measure the dispute rates as the number of negotiations where no agreement is reached after a fixed time period has elapsed. In the bargaining treatment, everything is lost after a certain time period, and this is compared to a forced arbitration settlement. The authors recognize that this experimental design implicitly raises the costs of no agreement compared with the treatment with forced arbitration because the likelihood of receiving zero from arbitration is very small.¹³ This is different in the experimental design used here. The third party settlement is *not* enforced upon negotiators that do not close before a deadline, but it is a choice for negotiators to call upon a third party at any time during the negotiation. This implies that a negotiator can, if he believes that further negotiations would be costly, immediately submit the case to a third party and save negotiation costs.

Negotiation situations that facilitate the formation of different initial entitlements have been studied by Gächter and Riedl (2005, 2006). They find strong

¹³It is also the practice in these experiments to show the negotiators previous decisions by the arbitrator in the form of draws from a normal distribution. This information has potentially little value because there is nothing about the background history of offers or possible entitlement claims that the arbitrator would consider before a decision is reached. In the experiment reported here no information is provided about the arbitrators except that they are randomly drawn from among the participants in the room.

effects of entitlements on bargaining behaviour in an experiment where participants know whether they rank above or below the median answer to a general knowledge quiz. They find that most of the participants choose to split the endowment after a loss proportional to the entitlements that are suggested to them before the loss occurs. Gächter and Riedl (2006) find that proportionality is preferred in a questionnaire survey and that equality is more prevalent in actual negotiations.

The overall importance of entitlement in negotiations is confirmed in the experiment reported here. The literature has shown that proportionality is a strong principle held by many people in production contexts. The introduction of a third party settlement option induces the negotiators to change their strategy so that the offers are even more proportional to individual production. This paper adds to the literature by showing that a third party settlement option can increase the efficiency of bargaining in the sense of reducing the costs associated with rounds of alternating offers.

6 Concluding remarks

The costs associated with transactions in the broad sense constitute a large share of the economy, and the efficiency of institutions that facilitate transactions is of great importance for economic performance (North, 1990). Substantial resources are devoted to the formation and enforcement of contracts, and the resolution of disputes through arbitration, mediation and, of course, the legal system. It is important to build institutional arrangements that provide flexibility for people to negotiate their own solution, but at the same time provide efficient mechanisms to settle bargaining impasses.

The experimental results showed that both the negotiation efficiency and the distribution of payoffs are affected by the introduction of a third party. There is a significant reduction in dispute costs with the possibility of third party settlement. The introduction of a choice of a third party solution reduced dispute costs, primarily because it allows negotiators to cut short unfair treatment. The experiment provided an example of a third party mechanism that reduces the dispute costs, which is in contrast to the previous literature on arbitration. An implication for the efficiency of the design of a third party mechanism is that the option to submit the case to a third party should be available throughout the entire negotiation process, and not only after a period of time has elapsed. This ensures negotiators cut short unfair demands that would possibly lead to long and costly negotiations.

The efficiency gain from an option to use a third party is accompanied by an increase in the inequality of the distribution of gains, more in line with each person's contribution. The change in the distributional properties of the outcome that results from the introduction of a possible third party settlement raises a

normative question of whether it is acceptable to influence the settlements such that other allocations are implemented than would result from negotiations between the parties without interference. In the experiment reported here, third parties favoured a fairness principle that was supported by a majority of negotiators. But the principle that a third party apply can run counter to the principle of fairness that has a broader legitimacy in society. Dworkin (2006) argues that legal theory at the adjudicative stage should require judges not only to uphold values of efficiency and coordination, but also to look to morality to decide the law. An important question then becomes the selection procedures of third parties.

Throughout the paper, we assumed that the parties agreed on the use of a specific third party mechanism. To agree on the use of such a mechanism during contracting is a negotiation in itself. It would therefore be interesting for further research to investigate how the commitment to the use of a third party in the contract phase influences the post-contractual negotiation behaviour under possible third party settlement.

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Appendix A Instructions

This supplement contains all the instructions read to the participants during the experiment. The four subsections follow the structure of the experiment explained in Section 2 of the paper. This supplement contains instructions for both treatments. For the bargaining treatment, the instructions can be read by using all the text in square brackets and deleting all the text in curly brackets, and vice versa for the third party treatment. The instructions were given in Norwegian. The translation is by the author.

General introduction

Welcome to this experiment. My name is (...) and I will guide you through the experiment. The results from the experiment will be used in a research project, and it is therefore important that you all stick to the rules that have been distributed:

- You should not talk to other participants.
- If you have questions or problems during the experiment, raise your hand and we will come to you.
- You should not open other web pages.

If you breach these rules, you will have to leave the room. There will be pauses during the experiment and it is important that you sit still and keep quiet during these.

You will be completely anonymous in the experiment. You will not at any time be asked about who you are. It will not be possible for us or the other participants to find out which choices you have made. You will be asked to make choices in several different situations in this experiment. For every situation, you will be randomly connected to another person in this room. Your actual payment will be determined as follows: we randomly draw one of the situations you were involved in and pay the amount of money you received in that situation. The choices that you make will not influence which situation is drawn; it will be an entirely random draw and there is an equal chance for all situations to be drawn. You should therefore think about each situation as if it is the one that determines how much you earn.

When the experiment is finished, you will see a payment code on the screen. You are asked to write down this code on a form that will be sent to the accounting department at (...). Employees at the accounting department will receive a list of codes and amounts from us and match these with the payment instructions from the forms. This is done so that nobody will know how much you earned.

{There are two different roles in the experiment. Most of you are participants in negotiations, while some of you are randomly drawn to act as a third party. The content of the folder shows which role you have been assigned. Negotiators have only received text marked A or text marked B. Those of you that are third parties have, in addition to the two pieces of text, received in the folder at your desk a booklet labelled 'Examples and questions'.}

The experiment consists of four phases. I will now explain the main features of the experiment. I will stop before we start a new phase and explain in more detail what

you should do in each phase. In the first phase of the experiment, you should copy text for 10 minutes in Word. You will be paid a price for each correct word you have typed. In phase two of the experiment you will be randomly matched with other persons in this room, and each of you in a pair will choose how much of the combined production value you will distribute to yourself and to the other person. You will be involved in four such *situations of distribution*.

In the third phase of the experiment, you will also be randomly matched with people in this room. You will then *negotiate* about the division of the combined production value by sending proposals to each other until one of you accepts the other's proposal. The production value shrinks by 4% every time one of you does not accept the other's proposal. {You will also have the opportunity to let a third person in this room decide the distribution. The third party does not have any other tasks than to decide on distributions that are sent to him or her.} You will be involved in four such *situations of negotiation*. In the last phase of the experiment you are asked to answer a few questions about the type of situations that you have experienced.

Introduction phase 1

The first thing [you] {negotiators} will do is to copy text from an official report that is marked with either an A or a B, and which you will find in the folder on your desk. You will copy the text into Word when I tell you to start. I will tell you when 10 minutes have passed and everybody must then stop. You will be paid for each correct word you type. You may use the spellchecker in Word.

{Some of you will be drawn to act as a third party and you will make decisions in particular situations if other participants request this later in the experiment. Those of you who are third parties should first read through the four examples of negotiation that are in the folder, and then answer the five questions in the folder. The answers should be written in Word at the same time the others copy text. The third parties will later be asked to provide answers to the questions on their screen. Those who are third parties will receive 300 kroner for the job. This amount is fixed and is not influenced by what you do in the experiment.}

{To everybody,} I remind you that you should raise your hand if you have any problems or questions, and then one of us in the research group will come and help you. You can now open a new document in Word and we will soon start to type. *You can start typing now* .

Everybody must now stop typing. [You] {Those of you that are negotiators} should now highlight all the text typed and copy it to the window in the Mozilla browser, then click on the button marked 'submit text'. {Those of you who are third parties should not do anything now; however, you will later be asked to submit your answers to the questions.}

After having submitted the text you will see a screen that shows how much you have produced and the value of your production. The production is rounded off to the nearest 50 words. Half of [you] {negotiators} have copied text marked A, which is an excerpt from an official report on the merger of the telecoms, IT, and media sectors. You will receive one krone and 50 oere for each correct word you have typed. The

other half of [you] {negotiators} have copied text marked B, which is an excerpt from an official report about Norwegian performing art. You will receive 75 oere for each correct word you have typed. These prices are randomly determined by us. Finally, click on the button marked ‘continue’.

Introduction phase 2

[You] {Negotiators} will now be randomly matched with other people in this room. In each *situation of distribution* you will not know who the other person is, and the other person will not know who you are. You will be informed about how many words he or she has produced and what price each of you has randomly been allocated. You will then choose a *distribution* of the combined production value between you and the other person. Remember that this is real money and the way that you divide the money determines how much you earn and how much the other person earns. You will be asked to make decisions in two such *situations of distribution*. In two other situations of distribution, another person will decide how much he or she will distribute to you.

After you have registered the distribution, you will see a new screen where you are asked either to confirm the distribution or to go back and change the distribution. When you have confirmed your choices, you will receive a message that you have finished the second phase of the experiment. You should then quietly wait for all the other people in the room to finish making choices in their situations. On the computer you will soon see a screen with the first situation and you can then start making choices. {Third parties can continue and will later be asked to deliver the answers.}

Introduction phase 3

Everybody has finished the second phase and I shall now explain what you will do in the third phase of the experiment. [You] {Negotiators} will this time also be randomly matched with other people in this room. In each *situation of negotiation* you will not know who the other person is and the other person will not know who you are. You will be informed about how many words the other person has produced and what price he or she has randomly been allocated. One of you is randomly drawn to make the first proposal for division of the combined production value. The proposal will be sent to the other person and he or she has [two] {three} choices: to accept your proposal or to make a new proposal for division {, or to decide that the distribution will be determined by a third person in the room}. New proposals are sent back and forth until one of you chooses to accept the proposal {or to give a third party the task of deciding the distribution}. Every time one of you does not accept the proposal for division, but comes up with a new proposal, the remaining production value will be reduced by 4%. {If you choose to let a third party decide the distribution, the remaining production value is reduced by another 6%, in total 10%. Third parties will have information about both participants’ production and negotiation history.} Everybody will be involved in four such situations of negotiation.

In some situations you will be asked what you think will be the final outcome of the negotiation {and how a possible third party will divide the amount}. If your answer is

within a deviation of plus or minus 20 kroner of the actual result, you will receive 20 kroner in extra payment, with one exception: if you guessed the negotiation result in a situation, and this particular result was randomly drawn, you will *not* receive the extra payment for a correct guess but only the payout in this situation. You will also be asked to state how *certain* you are about your guess. Your answer should be given in terms of a certainty percentage, that is, a number between 0 and 100. It is important that you write a high percentage if you are certain that this will be the result, and a low percentage if you are uncertain if this will be the final result.

{Those of you that have been drawn to be a third party will within the next 10 minutes copy the answers to the questions from Word into the window on the browser. You will also paste your proposal for division of the four examples from the folder. When you have done that, click on ‘submit answer’ and you will be asked to wait until possible situations arise in which you are asked to decide. After a short period of time you will see these situations on the screen and you can then start to decide on the distributions.}

On the computer [you] {negotiators} will soon see a new screen with the first situation and you can then start to negotiate. When the situation is accepted {or one of you has chosen to have a third party decide the situation}, you will automatically get a new situation to negotiate. When you have finished all the negotiation situations, you will be asked to wait until everybody has finished their choices.

Introduction phase 4

Everybody has finished and we will soon draw the situation that will decide your payment from this experiment. First, we ask you to answer a few questions. Soon you will see a new screen with information about the first question. You should click on the button marked ‘go forward’ when you have read the information and thereafter you should answer all the questions.

Closing and payment

Everybody has now answered the questions. You will soon see a screen that informs you about which situation has randomly been drawn, and how much you earned in this situation. This screen will be open for 45 seconds. Thereafter you will automatically be forwarded to a new screen, which only contains a payment code.

Everybody now has a screen with the payment code. Write down this payment code on the form that you find in the folder next to you. On the form also write down your name and bank account details. Put the form in the envelope and place it in the box by the door when you leave the room.

The experiment is now finished and, on behalf of the research team, I thank you again for your participation in this experiment.

Appendix B Questionnaire

This supplement contains questions given to negotiators after the experiment had ended. The questionnaire was given Norwegian. The translation is by the author.

Information

Person A and person B have produced a good or a service with a total value of 1000 kroner. The value of A's and B's production is determined by how much effort they have exerted and the price that they receive for what they have produced. The individual effort is determined both by how hard each has worked and by the individuals' skill in this type of work. The price is randomly determined and cannot be influenced by the individual.

Below you can see an example of such a situation. Click on the button below to see more examples. You will thereafter be asked to state what *you* think is the fairest way of dividing the combined production value. Note that the combined production value in all of the examples is 1000 kroner.

Production	You	The other person
Effort	200 units	200 units
Price of effort	4 kr	1 kr
Production value	800 kr	200 kr

Table 7: Example 1

Production	You	The other person
Effort	800 units	200 units
Price of effort	1 kr	1 kr
Production value	800 kr	200 kr

Table 8: Example 2

Production	You	The other person
Effort	150 units	400 units
Price of effort	4 kr	1 kr
Production value	600 kr	400 kr

Table 9: Example 3

Question 1

Now mark the principle that *you* think gives the fairest division in these types of situations. How would you divide the total production value between you and the other person?

- Divide equally
- Divide proportional to individual production value
- Divide proportional to individual effort

Question 2

Is this the sort of situation in which people ought to play fair or is it socially acceptable to use whatever bargaining power one has?

- Use bargaining power
- Play fair

Question 3

Rank from 1 (very important) to 4 (not so important) what *you* believe is important in order to reach an agreement where you achieve your own goals in negotiations. Write a number from 1 to 4 in all the boxes below. You cannot write the same number in more than one box.

- You are willing to make concessions
- You have more bargaining power
- You seek a fair outcome
- You have a strong opening position

Questions for third parties only

1. What do you think explains why a person would let a third party decide the outcome of a negotiation?
2. Which aspects of these negotiations would you emphasize as a third party? (*refers to four detailed examples on negotiations that are presented in writing*)
3. Why would you emphasize these aspects?
4. How do you think the possibility of letting a third party decide the outcome of a negotiation influences the proposals made by the parties during a negotiation?
5. Will the proposals that the parties have made during the negotiation influence your judgement as a third party? If so, how?

Appendix C Selected screenshots

This supplement contains a selection of the screenshots from the experiment. In the heading of the screenshot there is a reference to the phase of the experiment explained in Section 2 of the paper. This supplement contains screenshots from both treatments. The screenshots are in Norwegian. The translation of the main text on the screen follows below the screenshots. The translation is by the author.

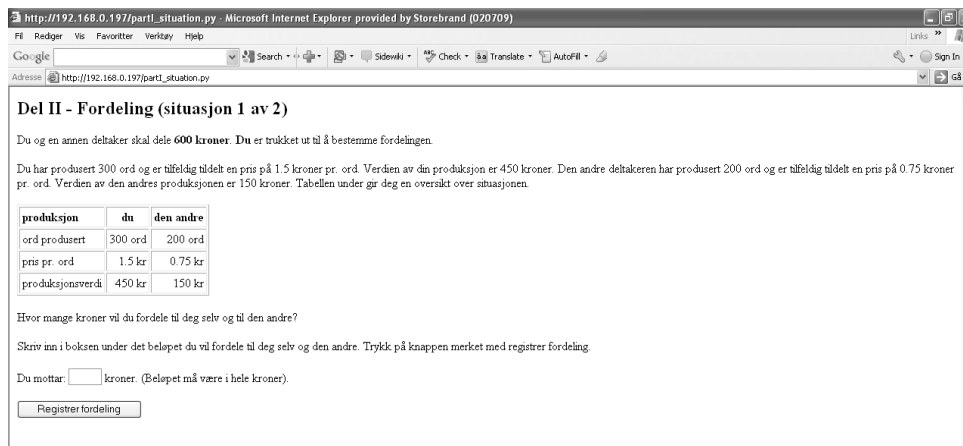


Figure 5: Dictator game

Phase II - Distribution (situation 1 of 2)

You and another participant shall divide **600 kroner**. **You** have been drawn to decide the distribution. You have produced 300 words and are randomly assigned a price of 1.5 kroner per word. The value of your production is 450 kroner. The other participant has produced 200 words and is randomly assigned a price of 0.75 kroner per word. The value of the other's production is 150 kroner. The table below gives you an overview of the situation.

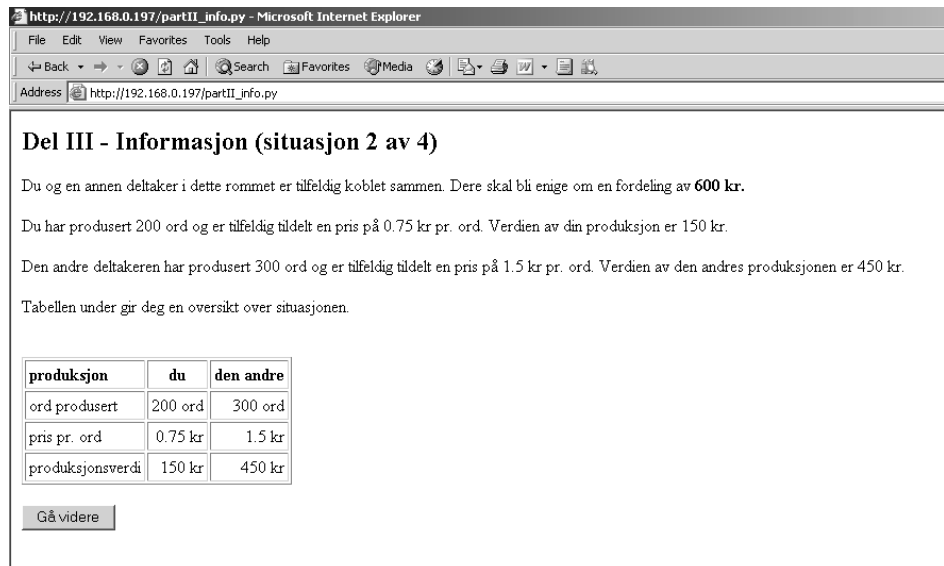
production	you	the other
words produced	300 words	200 words
price per word	1.5 kr	0.75 kr
production value	450 kr	150 kr

How many kroner will you distribute to yourself and to the other?

Write into the box below the amount you will distribute to yourself and the other. Click on the button marked with submit distribution.

You receive: kroner. (The amount must be in whole kroner).

Figure 6: Information about a bargaining situation



Phase III - Information (situation 2 of 4)

You and another participant in this room have been randomly matched. You shall agree about the division of **600 kr.**

You have produced 200 words and are randomly assigned a price of 0.75 kr per word. The value of your production is 150 kr. The other participant has produced 300 words and is randomly assigned a price of 1.5 kr per word. The value of the other's production is 450 kr. The table below gives you an overview of the situation.

production	you	the other
words produced	200 words	300 words
price per word	0.75 kr	1.5 kr
production value	150 kr	450 kr

Figure 7: Beliefs about the outcome of the bargaining

Del III - Hva tror du blir den endelige fordelingen (situasjon 2 av 4)

Før du velger å sende et forslag til fordeling til den andre, ber vi deg svare på hva du tror blir din andel av den endelige fordelingen av **600 kroner** i samlet produksjonsverdi i denne situasjonen.

Du vil motta **20 kroner** ekstra hvis svaret ditt er innenfor pluss eller minus 20 kroner avvik fra det som blir den faktiske fordelingen.

Dersom akkurat denne situasjonen blir trukket ut vil du ikke få både gevinsten i situasjonen og ekstrabetaling.

Du mottar: kroner. (Beløpet må være i hele kroner).

Skriv ned hvor sikker du er på at dere blir enige om denne fordelingen i prosent.

Jeg er prosent sikker på at dette blir resultatet.

produksjon	du	den andre
ord produsert	200 ord	300 ord
pris pr. ord	0.75 kr	1.5 kr
produksjonsverdi	150 kr	450 kr

Phase III - What do you think will be the finale division (situation 2 of 4)

Before you choose to send a proposal for division to the other, we ask you to answer what you think will be your share the final division of **600 kroner** in total production value in this situation.

You will receive **20 kroner** extra if your answer is within plus or minus 20 kroner deviation from what the actual division turns out to be. If this particular situation is drawn you will not receive both the earnings in the situation and the extra earnings.

You receive: kroner. (The amount must be in whole kroner).

Write down in per cent how sure you are that you will agree about this division.

I am per cent sure that this will be the result.

production	you	the other
words produced	200 words	300 words
price per word	0.75 kr	1.5 kr
production value	150 kr	450 kr

Figure 8: The first offer decision

The screenshot shows a Microsoft Internet Explorer browser window with the address bar displaying `http://192.168.0.197/partII_situation.py`. The page content is as follows:

Del III - Forslag til fordeling (situasjon 2 av 4)

Du og en annen deltaker skal sammen bli enige om en fordeling av **600 kr**.

Hver gang en av dere ikke aksepterer den andres forslag, men foreslår en annen fordeling, vil beløpet som er til fordeling bli redusert med 4 prosent.

Tabellen under viser hvor mye du og den andre har produsert og hvilken pris dere tilfeldig er tildelt.

produksjon	du	den andre
ord produsert	200 ord	300 ord
pris pr. ord	0.75 kr	1.5 kr
produksjonsverdi	150 kr	450 kr

Hvor mye vil du foreslå at du mottar? kroner. (Beløpet må være i hele kroner).

Phase III - Proposal to division (situation 2 of 4)

You and another participant shall together agree on a division of **600 kr**.

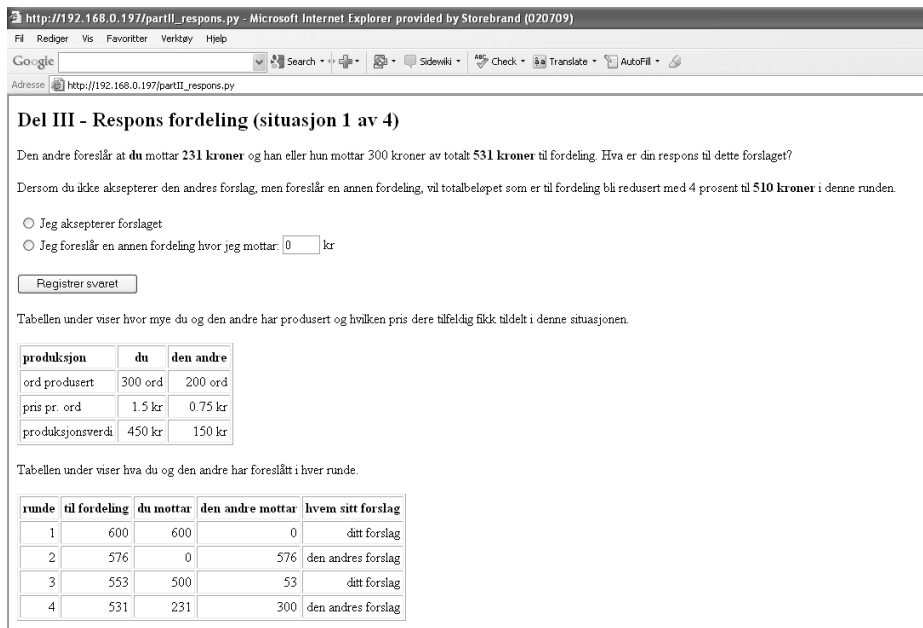
Every time one of you does not accept the others proposal, but suggests a different division, the total amount to divide will be reduced by 4 per cent.

The table below shows how much you and the other have produced and which prices that you have been randomly assigned.

production	you	the other
words produced	200 words	300 words
price per word	0.75 kr	1.5 kr
production value	150 kr	450 kr

How much do you propose that you receive? kroner. (The amount must be in whole kroner).

Figure 9: The reoffer decision in the bargaining treatment



Phase III - Response division (situation 1 of 4)

The other proposes that **you** receive **231 kroner** and that he or she receives 300 kroner of the total of **531 kroner** to divide. What is your response to this proposal?

If you do not accept the other's proposal, but make a different proposal, the total amount to divide will be reduced by 4 per cent to **510 kroner** in this round.

- I accept the proposal
- I propose a different division where I receive kr.

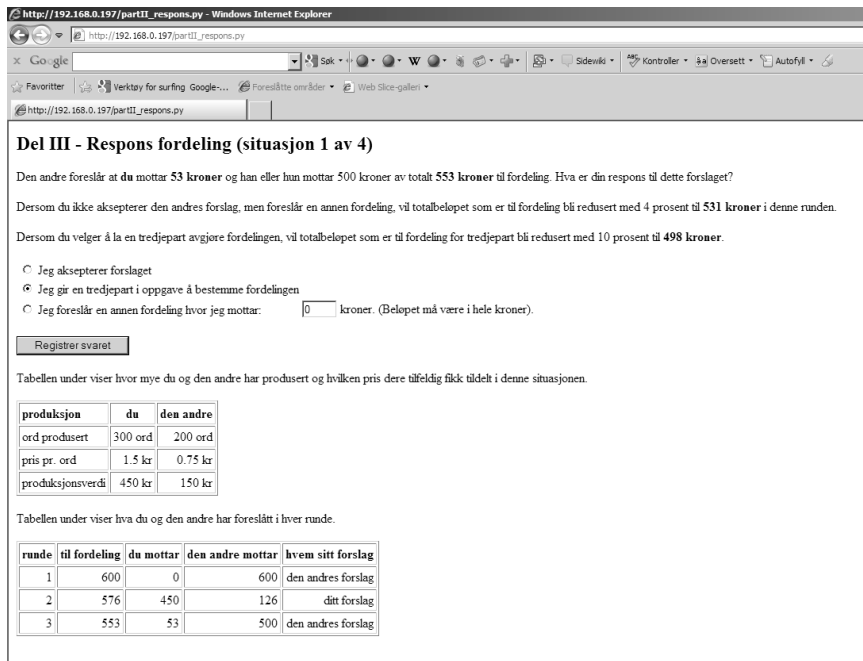
The table below shows how much you and the other have produced and which prices that you have been randomly assigned in this situation.

production	you	the other
words produced	300 words	200 words
price per word	1.5 kr	0.75 kr
production value	450 kr	150 kr

The table below shows what you and the other have proposed in each round.

round	to divide	you receive	the other receives	who made the proposal
1	600	600	0	your proposal
2	576	0	576	the other's proposal
3	553	500	53	your proposal
4	531	231	300	the other's proposal

Figure 10: The reoffer decision in the third party treatment



Phase III - Response division (situation 1 of 4)

The other proposes that you receive **53 kroner** and that he or she receives 500 kroner of the total of **553 kroner** to divide. What is your response to this proposal?

If you do not accept the other's proposal, but make a different proposal, the total amount to divide will be reduced by 4 per cent to **531 kroner** in this round.

If you choose to let a third party decide the division, the total amount that the third party shall divide will be reduced by 10 per cent to **498 kroner**.

- I accept the proposal
- I give a third party the task of deciding the division
- I propose a different division where I receive kroner.

The table below shows how much you and the other have produced and which prices that you have been randomly assigned in this situation.

production	you	the other
words produced	300 words	200 words
price per word	1.5 kr	0.75 kr
production value	450 kr	150 kr

The table below shows what you and the other have proposed in each round.

round	to divide	you receive	the other receives	who made the proposal
1	600	0	600	the other's proposal
2	576	450	126	your proposal
3	553	53	500	the other's proposal

Figure 11: Beliefs about the third party decision

http://192.168.0.197/arbbelief.py - Windows Internet Explorer

http://192.168.0.197/arbbelief.py

Google

Favoritter Verktøy for surfing Google... Foreslåtte områder Web Slice-galleri

http://192.168.0.197/arbbelief.py

Del II - Hva tror du tredjeparten gjør? (situasjon 4 av 4)

Du har valgt å la en tredjepart avgjøre fordelingen av 459 kr. For dette skjer ber vi deg om å svare på hva du tror blir fordelingen denne tredjeparten velger.

Du vil motta 20 kr ekstra hvis svaret ditt er innenfor pluss eller minus 20 kroner avvik av det tredjeparten faktisk velger.

Du mottar: kroner. (Beløpet må være i hele kroner.)

Skriv ned hvor sikker du er på at dette blir den fordelingen den tredje personen faktisk velger i prosent.

Jeg er prosent sikker på at dette blir resultatet.

Tabellen under viser hvor mye du og den andre har produsert og hvilken pris dere tilfeldig fikk tildelt i denne situasjonen

produksjon	du	den andre
ord produsert	300 ord	200 ord
pris pr. ord	1.5 kr	0.75 kr
produksjonsverdi	450 kr	150 kr

Tabellen under viser hva du og den andre har foreslått i hver runde.

runde	til fordeling	du mottar	den andre mottar	hvem sitt forslag
1	600	300	300	den andres forslag
2	576	450	126	ditt forslag
3	553	253	300	den andres forslag
4	531	450	81	ditt forslag
5	510	210	300	den andres forslag
6		bestemt at tredjeperson avgjør		ditt forslag

Phase III - What do you think the third party will do? (situation 4 of 4)

You have chosen to let a third party decide the division of 459 kr. Before that happens we ask you to answer what you think will be the division that this third party chooses.

You will receive 20 kroner extra if your answer is within plus or minus 20 kroner deviation from what the third party actually decide.

You receive: kroner. (The amount must be in whole kroner).

Write down in per cent how sure you are that this is the division that the third party actually chooses.

I am per cent sure that this will be the result.

The table below shows how much you and the other have produced and which prices that you have been randomly assigned in this situation.

production	you	the other
words produced	300 words	200 words
price per word	1.5 kr	0.75 kr
production value	450 kr	150 kr

The table below shows what you and the other have proposed in each round.

round	to divide	you receive	the other receives	who made the proposal
1	600	300	300	the other's proposal
2	576	450	126	your proposal
3	553	253	300	the other's proposal
4	531	450	81	your proposal
5	510	210	300	the other's proposal
6		Let third party decide		your proposal

Figure 12: The third party decision

http://192.168.0.197/arbitration_info.py - Microsoft Internet Explorer provided by Storebrand (020709)

Adresse http://192.168.0.197/arbitration_info.py

Del III - Informasjon

To andre deltakere er ikke enig om fordelingen av samlet produksjonsverdi.

Tabellen under viser hva deltaker 1 og 2 har produsert og hvilken pris de er tilfeldig tildelt.

Produksjon	Deltaker 1	Deltaker 2
Ord produsert	200 ord	300 ord
Pris pr. ord	0.75 kr	1.5 kr
Produksjonsverdi	150 kr	450 kr

Tabellen under viser beløpet hver deltaker har foreslått at han eller hun skulle motta i hver runde.

Runde	Til fordeling	Deltaker 1	Deltaker 2	Hvem sitt forslag
1	600	600	0	Deltaker 1
2	576	126	450	Deltaker 2
3	553	500	53	Deltaker 1
4		Bestemt at tredje person avgjør		Deltaker 2

Deltaker 2 aksepterte ikke tilbudet i runde 3 og har bestemt at du skal avgjøre fordelingen av **498 kr** mellom de to deltakerne i denne situasjonen.

Beslutningen har ført til at beløpet som du skal fordele er redusert med 10 prosent.

Beløp du velger vil **ikke** påvirke din betaling i eksperimentet.

Hvor mye vil du bestemme at deltaker 1 mottar? kr.

Phase III - Information

Two other participants have not agreed on the division of a total production value. The table below shows what participants 1 and 2 have produced and which prices they have randomly been assigned.

Production	Participant 1	Participant 2
Words produced	200 words	300 words
Price per word	0.75 kr	1.5 kr
Production value	150 kr	450 kr

The table below shows the amounts that each participant has proposed that he or she should receive in each round.

Round	To divide	Participant 1	Participant 2	who made the proposal
1	600	600	0	Participant 1
2	576	126	450	Participant 2
3	553	500	53	Participant 1
4		Let third party decide		Participant 2

Participant 2 did not accept the offer in round 3 and has decided that you shall decide the division of **498 kr** between the two participants in this situation. The decision has reduced the amount that you shall divide with 10 per cent. The amount you choose will **not** affect your own payment in the experiment. How much do you decide that participant 1 receives? kr.



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