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Gender Differences in Alternating-Offer Bargaining: An Experimental Study*

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January 2, 2022

Abstract

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share of the pie. As a result, men and women showed similar overall earnings but earnings were lower when bargaining *with* men. We found suggestive evidence that gender differences diminished when we reduced ambiguity regarding the sharing norms by providing information about other participants' agreements in asymmetric environments.

1 INTRODUCTION

The gender wage gap has long been a major subject for study in economics. Although it has shown a decreasing trend over time, its persistence in developed countries challenges classical explanations based on differences in human capital, preferences and statistical discrimination (Blau and Kahn, 2000, 2017). Gender differences in negotiation have been put forward as an alternative explanation for the gender wage gap. Starting wages are often the result of bilateral negotiation. Moreover, wages are also affected by negotiations that come later in one's career, e.g., for pay increases. If women are less likely to negotiate starting salaries and to ask for pay increases, and/or if women obtain worse deals when negotiating, this would clearly go some way towards explaining the gender wage gap (Azmat and Petrongolo, 2014; Card et al., 2016; Sin et al., 2020).

The stereotypical behavior in bargaining is that men are better bargainers than women. It is time to switch the focus from *whether* there are gender differences to *when* they will be observed. Mazei et al. (2015) offer the most recent meta-analysis on gender differences in negotiation and their moderators, building on the previous work by Stuhlmacher and Walters (1999). Men were found to achieve better outcomes than women, but these gender differences were found to depend on the context. One important moderating factor is what psychologists labeled *structural ambiguity*. Building on Mischel (1977)'s notion of ambiguous (or weak) and unambiguous (or strong) situations, gender differences were mostly found in situations where people did not have a clear protocol or script for appropriate behavior. In these situations, people relied on more general behavioral schemata and available social norms, such as preconceived gender roles and stereotypes (Bowles et al., 2005).[1]

[1]Gender differences in the willingness to start a negotiation have also experienced a similar change of focus. Since the pioneering work by Babcock and Laschever (2009) "Women Don't Ask", Kugler et al. (2018) performed a meta-analysis of existing work in psychology and they concluded that there is ample evidence for the existence of gender differences in the likelihood of starting a negotiation. However, these differences are smaller when situational ambiguity regarding the appropriateness of negotiating is low rather than high, as well as when situational cues are more consistent with the female gender role than with the male gender role (see recent work in economics by Leibbrandt and List, 2014). See also Hernandez-Arenaz and Iriberri (2019) for a review.

This paper studies the relationship between the existing ambiguity regarding the sharing norms and the existence of gender differences in bargaining. We propose using a controlled environment such as the laboratory, to study when gender differences will be observed in structured alternating-offer bargaining environments. The design of the experiment was registered at the *AEA RCT registry*, under the reference AEARCTR-0002029.[2] A laboratory setting allows researchers to study gender differences in bargaining environments that vary in the existing ambiguity regarding the sharing norm, which was the main treatment variable we used. In addition, the laboratory offers the possibility of measuring individuals' self-assessment of their ability to perform a task and to bargain, as well as their risk and social preferences, which are hard, if not impossible, to control for when using observational data. We hypothesize that, ceteris paribus, the higher the ambiguity regarding the existing sharing norm, the more likely and stronger will be the gender differences.

We use a symmetric bargaining setting as a benchmark, where bargaining parties show equal strength so that a 50:50 split of the pie is the only expected sharing norm. We hypothesize that in this benchmark setting, participants will follow the norm so that neither gender differences nor gender interaction effects appear.

We then modify the symmetric environment to introduce three common sources of asymmetries existing in the real world: empowerment (only the proposer has a positive outside option), entitlement (the proposer is entitled to a greater share than the responder) and informational asymmetry (only the proposer knows the actual size of the pie)[3]. We chose these particular asymmetries because they are present in many economic-relevant situations such as in salary negotiations. For example, whenever any of the bargaining roles has an outside option (an employer with multiple potential employees or employees with multiple job offers), empowerment will be in play. In situations with a feeling of ownership of the surpluses on which the participants are negotiating, such as in negotiations about promotions, entitlement is in play. Finally, employees almost never know the exact size of the salary or promotion that

[2]The pre-plan analysis can be checked at https://www.socialscienceregistry.org/trials/2029/history/15499. Additional treatments with past agreements, see Figure 1, were not part of the pre-plan analysis but were added after suggestions by referees.

[3]Kagel et al. (1996) do a similar manipulation on informational asymmetries.

is attainable, generating an informational asymmetry. The existence of these asymmetries not only makes one bargaining party stronger (the *proposer* in our setting) and the other weaker (the *responder* in our setting), but also increases the ambiguity regarding what one could expect as the bargaining outcome. To put it simply, in all three asymmetric environments, the proposer is expected to get more than the responder, but it is not clear how much more. We hypothesize that these environments would be the ones in which gender differences in bargaining are likely to flourish. Lastly, in a final treatment variation, we aim to maintain the asymmetry in the bargaining environment but reduce ambiguity in the asymmetric bargaining environments by providing participants with the modal agreements of other participants in past experiments. We hypothesize that, if anything, gender differences should decrease when ambiguity is reduced.

Our laboratory study consisted of three main tasks. Subjects first performed a real effort task, where each subject obtained a score for productivity which then determined the pie to be shared. In the second task, subjects were randomly paired and had 3 minutes to bargain over the pie via alternating-offer. The bargaining task consisted of 10 bargaining periods of 3-minutes each with a different paired participant each time. Finally, in the third task, we elicited a set of beliefs to measure their self-assessed ability in the task and in bargaining, as well as risk and social preferences.

The laboratory design relied on random pairing of individuals to form the pairs that will bargain over a pie, and on men and women being ex-ante equally likely to be allocated to either the strong or the weak bargaining position. This design allowed us to study two main important questions on gender differences when bargaining. Firstly, we studied gender differences and gender interaction effects in bargaining outcomes (probability of reaching an agreement, overall earnings, and earnings conditional on reaching an agreement) in the symmetric and the asymmetric bargaining environments, with and without information about past agreements. Secondly, we tested whether men and women react differently to the presence of asymmetries and to the presence of information about past agreements in asymmetric bargaining environments, i.e., whether gender is an effect modifying factor. To do this, we compared gender differences in each asymmetric environment with those in the symmetric environment, together with gender differences in the asymmetric environments with and without information about

past agreements.

In the symmetric bargaining benchmark, as expected, we found that the 50:50 split is largely followed. Indeed 69.1% of successful negotiations end up with the pie being split exactly equally. As conjectured, we found no hard evidence for gender differences or gender interaction effects. When asymmetries are introduced, we did find important gender differences in the stereotypically expected direction. Firstly, men showed a lower likelihood of reaching an agreement, especially in the responder's role. Secondly, when an agreement was reached, men showed the ability to secure a higher share of the pie, especially in the proposer's role. These differences are consistent with most findings both in economics and psychology. As these two differences have the opposite effect on overall earnings, it turns out that men and women do not show significant differences in either role. However, overall earnings are lower when bargaining *with* men. Finally, when past agreements are provided in the asymmetric bargaining environments, the fact that men show a lower likelihood of agreement is no longer significant, attenuating the existing gender differences in part.

When comparing gender differences in each asymmetric bargaining environment with those in the symmetric bargaining environment, we found evidence for gender being an effect-modifying factor for empowerment but not so for entitlement and informational asymmetries, although they did go in the expected direction. Furthermore, when comparing gender differences in asymmetric environments with and without past agreements, again, although in the expected direction, we did not find hard evidence that gender is an effect modifying factor for the provision of past agreements. When we tested the variation in the existing ambiguity, we observed that the empowerment treatment showed the highest change in ambiguity, while other manipulations (entitlement, informational asymmetries, and the provision of past agreements) showed a lower change in ambiguity. Hence, we did expect highest differences in the empowerment treatment.

In the robustness section we performed two additional tests. Firstly, we found that a minority of participants, 7.65% of them, mentioned gender as an objective to be studied by the experiment. Therefore, we tested how robust the main findings are to potential experimenter demand effects. Secondly, we found an important deadline effect. About a quarter of the suc-

cessful negotiations were reached within the last 10 seconds of the 3-minute time limit. This is consistent with previous experimental findings in bargaining (e.g., Roth et al., 1988; Gneezy et al., 2003). Although these two checks were not contemplated in the pre-plan analysis, we found that the main findings were robust with respect to both potential experimenter demand and deadline effects.

Gender differences in bargaining have been studied by economists. For example, gender differences in negotiation were found by studying male proposers' behavior in field experiments in which the gender of potential scripted buyers varied (Ayres, 1991; Ayres and Siegelman, 1995; Castillo et al., 2013).[4] To study gender differences in wage negotiation, Säve-Söderbergh (2019) used wage bids and wage offers of recent graduates and finds that women post lower wage bids, and receive lower offers. More recently, Andersen et al. (2018) found that men obtain better deals than women among the members of a patriarchal society while the reverse was true for a matriarchal society. Economists have also studied gender differences in controlled settings such as laboratories, mostly using the ultimatum game, which represents a reduced-form bargaining setting, as it allows for a single offer (or demand) and the response to it. Rigdon (2012) found that women demand less than men in a demand-ultimatum-game in the laboratory. More recently, when studying gender differences in the choice to negotiate, Exley et al. (2020) included a baseline treatment, where subjects were *forced* to negotiate in an unstructured setting with limited time. They found that men and women achieve similar earnings. Note that apparently contradictory findings can be rationalized through our hypotheses and results. Those studies that find gender differences in bargaining are those that show greater ambiguity with respect to which sharing norm is adequate. However, Exley et al. (2020) used a setting that, while asymmetric, displayed a clear sharing norm that dictated how the pie should be divided, as bargaining parties knew exactly how much of the pie each bargaining party contributed. Consequently, in line with our hypotheses and results, these studies suggest that gender differences are likely to flourish only in those situations that show enough ambiguity.

Gender interaction effects in bargaining have received less attention. Given that bargaining

[4] In particular, Ayres (1991); Ayres and Siegelman (1995) both found that women obtain worse deals when buying a car while Castillo et al. (2013) found that women obtain better fares in taxi-rides.

requires interaction between two agents, gender differences in one role may crucially depend on the gender of the interlocutor. Economists are thus limited to the use of laboratory experiments. Using face-to-face ultimatum games, Eckel and Grossman (2001) found that women are more likely to accept offers from women (*solidarity*) and that men are more likely to accept offers from women (*chivalry*). In an ultimatum game where gender is commonly known Solnick (2001) found that women are more likely to accept offers from male proposers than from female proposers. Sutter et al. (2009a) found much more competition and retaliation and, thus, lower efficiency when the bargaining partners had the same gender than when they had the opposite gender. Huang and Low (2018) showed that gender differences can reverse when negotiating in a battle-of-the-sexes type setting when participants can use verbal communication as opposed to no communication. Closer to our alternating-offer bargaining setting, Dittrich et al. (2014) used a laboratory face-to-face alternating-offer wage-bargaining game where the firm was empowered, and found that starting salaries offered by men to women were lower than those offered by women to men, resulting in significant gender interaction effects on wage-bargaining outcomes. Using data from a TV-show in which bargaining parties showed major asymmetries in all three dimensions (empowerment, entitlement and information), Hernandez-Arenaz and Iriberri (2018) found that the pairing between a male proposer (strong) and a female responder (weak) was the only one that differed from the rest, yielding higher profits for the proposer. Contrary to our findings here, they found significant interaction effects. However, as pointed out above, this may be because their settings have more than one type of asymmetry simultaneously.

Our paper makes two contributions over existing work. Firstly, and most importantly, it proposes a way to determine when gender differences in bargaining can be expected: when ambiguity is highest. This is confirmed by our experimental results and is consistent with other findings in the literature, both in economics and psychology. Regarding the contribution over the studies in economics, it is the first study to manipulate the existing ambiguity when studying bargaining outcomes in connection to gender differences. Regarding the work in psychology, we offer a framework to think about what *structural ambiguity* means or materializes into, providing the comparison of symmetric (no ambiguity) versus asymmetric environments that

lack a clear sharing rule (highest ambiguity), and propose a way in which ambiguity can be reduced (through the provision of past agreements). Secondly, it proposes an experimental framework for studying not only gender differences but gender interaction effects, which have not been studied as much as gender differences, in a rich structured bargaining environment such as the alternating-offer bargaining, bringing the environment closer to reality and at the same time being observable to the researcher.

The rest of the paper is organized as follows. Section 2 describes the procedures and design of the laboratory experiment, the data, the identification strategy, and the hypotheses. Section 3 describes the main results. Section 4 concludes.

2 Experimental Procedures and Design

A laboratory experiment was run at the Bilbao Laboratory of Experimental Analysis (Bilbao Labean) at the University of the Basque Country and at the Experimental Economics Lab (LEE) at University University Jaume I, on a computer-based form using z-Tree experimental software (Fischbacher, 2007). Subjects were recruited through ORSEE (Greiner, 2015), with a total of 562 participants –278 (49.4%) men and 284 (50.6%) women– split into sixteen different sessions. Recruiting was carried out in such a way that the gender balance in each session was assured while subjects were unaware of this at the time of recruiting.

At the beginning of each session, subjects were provided with written general instructions, which informed them that the experiment consisted of 3 different tasks and that the detailed instructions would be displayed on their computer screens before the start of each task. All instructions, both written general instructions and detailed instructions regarding each of the tasks, were read aloud to ensure that the information was public knowledge. A translation of the instructions can be found in Appendix B. Each session lasted for about one and a half hours, including payment. Average earnings were 15.32 Euro (s.d. 5.71) including a show-up fee of 3 Euro, and total earnings ranged from 5 Euro to 34.5 Euro.

2.1 Design: Treatments and Time-line of the Experiment

2.1.1 Treatments

Figure 1 summarizes the experimental treatments that aim to change the ambiguity regarding the sharing norms. Firstly, these bargaining environments differ from one another in terms of the existence of symmetry and, among the asymmetric bargaining environments, in terms of the source of the induced bargaining asymmetry (through empowerment, entitlement and information). In the symmetric environment, we expected the ambiguity to be lowest, as the only sensible sharing rule is the 50:50 split. In the asymmetric environments, we expected the ambiguity to be highest, as the 50:50 rule is no longer sensible and there is no other sensible sharing rule. In all of these sessions we provided no information regarding what other participants in previous sessions agreed on. Secondly, we aimed to reduce ambiguity with regard to the available sharing rules for *Empowerment* and *Entitlement*, providing subjects with the modal split of the pie in the sessions without information. We decided not to carry out additional treatment for the informational asymmetry as it is the lack of information that is the source of the asymmetry, such that providing past agreements may result in canceling out the asymmetry itself.

[Figure 1 here]

2.1.2 Time-line of the Experiment

All sessions included three different tasks: a real effort task, an alternating-offer bargaining task and a set of elicitation tasks. The real effort task and the elicitation tasks were identical in all sessions, but we varied the bargaining environment from one session to another, as described in Figure 1. We now provide further details about each of the bargaining environments.

Real Effort Task: Subjects were presented with a matrix filled with "0"s and "1"s similar to that in Figure 2 and asked to count the number of ones.[5] Once a number was entered for a matrix and the subject confirmed the input, a new matrix appeared on the screen. Subjects performed this task for 5 minutes and the performance measure was the total number of matrices for which

[5] A similar task was used in Abeler et al. (2011) and Mengel (2015).

the correct number of "1"s was provided.[6] This task was not directly incentivized but subjects were informed that their performance in this task was important for determining their earnings in the bargaining task.[7] Consistent with previous findings, this task proved to be gender neutral in performance, with regard to the number of matrices attempted, and the precision rate.[8]

[Figure 2 here]

Subjects' gender was elicited at the end of this task, just before taking on the bargaining task. In particular, they were presented with two avatars representing the silhouettes of a man and a woman and explicitly asked "Are you a man or a woman?". As can be seen in Figure 3, these avatars were chosen to elicit subjects' gender in the most aseptic and neutral way possible, without giving any further cues such as facial expressions. These avatars were used to make bargainers' genders common knowledge, as is clear in Figure 4.

[Figure 3 here]

Bargaining Task: Symmetric. Based on their relative performances in the real effort task, subjects were assigned a score for *productivity*, which determined the pie to be bargained over. Specifically, the top third of performers were endowed with a productivity of €15 , the middle third with a productivity of €10, and the bottom third with a productivity of €5. Subjects were only given precise details about this protocol after they completed the real effort task, but no information was provided about the actual number of matrices they solved correctly.

[6]The z-Tree program was designed such that the maximum number of matrices that could be attempted was 60. This was explicitly stated in the instructions. Data show that this constraint was not binding, as the maximum number of attempted matrices was 45. The average number of attempted matrices was 24.02.

[7]As will become clear in the explanation of the bargaining task, the relationship between performance and the pie to be bargained over in the bargaining task may induce competitive attitudes. To preclude any feeling of competition while subjects performed the real effort task, the instructions stated: "The number of correct answers that you provide will determine your productivity. The higher your productivity, the more money, on average, you will have for the next task".

[8]Men (278 observations) on average provided the correct number of "1"s in 19.48 matrices (s.d. 4.41), while women (284 observations) in 19.32 (s.d. 4.32). Moreover, this gender neutrality in terms of performance is also present in effort (number of attempted matrices), and precision (number of correct over number of attempted matrices).

Each subject was then randomly paired with another subject. One was assigned the role of Participant A (hereafter referred to as the *Proposer*) and the other that of Participant B (hereafter referred to as the *Responder*). The *Proposer* was the paired subject with the higher score in the real effort task, although this protocol was not revealed.[9] Within each pairing, the pie to be bargained over was randomly drawn from the productivity of the proposer and that of the responder with equal probabilities. This means that the pie could be of €5, €10, or €15. Once the pie size was determined, this information was made public, and each pairing had 3 minutes to reach a deal on how to split the pie through an alternating-offer bargaining process. During the bargaining, proposers decided on offers to responders while responders decided on demands from proposers. In other words, the whole bargaining process took place in terms of the amount of money that the responder would get. Proposers started the negotiation making the first offer to the responders. During the bargaining, the information available to all subjects consisted of their own avatar and that of the opponent (their gender and that of their paired partner), the size of the pie to be shared and the bargaining history of offers and demands. See Figure 4 for an illustration. Importantly, subjects could not see their own productivity or their opponent's. If they reached a deal within the 3-minute limit, the agreed split was implemented. Otherwise they got 0.

[Figure 4 here]

The whole bargaining process was repeated for 10 periods in all treatments, with a different paired participant each time.[10] Importantly, from one period to the next the role in the bargaining pairing (proposer or responder) and the pie to be split could change. For payment, subjects

[9] Subjects were only told that they would be given a bargaining role. Roles were assigned in this way in order to facilitate comparison across different bargaining environments. In the event of ties, roles were randomly assigned.

[10] In one of the *Symmetric* sessions there was a technical problem and the z-Tree program stopped at the second repetition. We ran the bargaining module again and everything worked fine the second time. Thus, we gathered data from 12 bargaining periods for the *Symmetric* environment, instead of 10 but, given that periods 1 and 3 and periods 2 and 4 involve exactly the same pairings, we only considered periods 1-2 and 5-12 when analyzing this bargaining environment.

were informed that the computer would take two periods randomly –one from periods 1-5 and another from periods 6-10– and the resulting outcomes would be implemented.

Bargaining Task: Empowerment. Everything was the same as for the *Symmetric* bargaining, except that there was an outside option for the proposer. In particular, if a deal was not reached within the 3-minute limit, the proposer had an outside option while the responder got 0. The outside option available to the proposer was a random amount drawn from a uniform distribution between 50% and 85% of the pie. Both parties knew about the outside option but neither knew its exact value when bargaining.

Bargaining Task: Empowerment with past agreements. Everything was the same as for *Empowerment* bargaining, except that we provided subjects with past agreements, i.e., the most frequent amount (mode) agreed for the responder in the sessions with empowerment. These amounts depended on the pie to be shared: 1, 1.5 and 5 Euro, when the pies were 5, 10 and 15 Euro, respectively. This information was presented to subjects during the negotiation just above the dialog box about the offer/demand.

Bargaining Task: Entitlement. Everything was the same as for *Symmetric* bargaining, except that subjects were able to see their own productivity and that of their partners. This was public knowledge. This bargaining environment thus informed subjects of whose productivity determined the size of the pie. This was intended to generate a feeling of entitlement.[11] In the event of a tie, there is no entitlement effect, meaning that we do not consider those bargaining pairings in the analysis in the rest of the paper (note the lower number of observations in the entitlement treatment).

Bargaining Task: Entitlement with past agreements. Everything was the same as for *Entitlement* bargaining, except that we provided subjects with past agreements, i.e., the most frequent amount (mode) agreed for the responder in the sessions with entitlement. These amounts

[11]Note that, by design, the productivity of the proposer was at least as high as that of the responder, because the role of proposer was assigned to the participant with the higher productivity score. Consequently, we argue that, when the size of the pie is the proposer's productivity, the proposer feels a positive entitlement –the pie is high thanks to the proposer's productivity– while when the pie size is the responder's productivity the responder feels a negative entitlement –the pie is low because of the responder's productivity. In footnote 19, we comment on gender differences when entitlement effects are split into these two cases.

depended on the pie to be shared: 2.5, 5 and 7 Euros, when the pies were 5, 10 and 15 Euros, respectively. This information was presented to subjects during the negotiation just above the dialog box about the offer/demand.

Bargaining Task: Information. Everything was the same as for the *Symmetric* environment, except that only the proposer could see the actual size of the pie, while the responder only knew that it could be 5, 10 or 15 Euro. This was public knowledge.

Elicitation Tasks. After completing the 10 bargaining periods, subjects entered the third and last task of the experiment. We first asked the subjects explicitly: "What do you think the objective of this experiment is?." This answer was not incentivized and they were allowed to provide their answers in free format. One potential concern with the way we made subjects' genders common knowledge is that this feature of the design could yield some type of experimenter demand effect, which we address in the robustness checks (subsection 3.3.1). Futhermore, in this task we elicited beliefs about self-assessed relative ability both in the real effort task and the bargaining task. As far as the real effort task is concerned, subjects were asked to reveal which quartile of the performance distribution they thought they were in and to state which gender they believed had performed better (or whether there were no gender differences). Similarly, for the bargaining task, subjects were asked to reveal which quartile of the distribution they thought they were in based on the relative surplus obtained during the 10 negotiations and to state which gender on average had obtained a greater share of the pie over the 10 periods (or whether there were no gender differences). Finally, we also elicited risk attitudes following the methodology in Eckel and Grossman (2002) and social preferences via the primary Slider Measure items described in Murphy et al. (2011) and implemented for z-Tree by Crosetto et al. (2012). All these measures were incentivized.[12] Table A1 in the Appendix A shows the mean values for these control variables by gender. The main notable gender differences show up in risk preferences, where women appear to be more risk averse than men, and

[12] At the end of the experiment subjects also completed a non-incentivized questionnaire that asked for standard demographics and for the big five personality traits (Gosling et al., 2003). When we ran a principal component analysis on the self-reported answers provided by our subjects, the resulting 5 principal factors do not match the structure provided by Gosling et al. (2003). Therefore, we decided not to use personality traits measures as individual controls.

less confident in both their ability at the real effort task and in their bargaining ability. Figures A1 and A2 in the Appendix A show subjects' perceptions about the gender nature of the task and bargaining by gender. Perceptions about the gender nature of the real effort task are split, with slightly more male subjects tending to believe it is a male task, while slightly more female subjects put more weight on the task being a female task. However, both male and female subjects perceive bargaining to be a male task.

2.2 Data, Hypotheses and Identification Strategy

2.2.1 Data

We gathered data on 2,487 different negotiations from 562 different experimental subjects.[13] We focused on three important bargaining outcomes. The first outcome in a negotiation was whether the parties reached an agreement or not. The success rate measured the efficiency of bargaining: only when an agreement was reached could surplus be created. Another important outcome was earnings, measured as the share of the pie. This outcome, however, can be measured in two different ways: overall earnings, not conditional on reaching an agreement, and earnings conditional on reaching an agreement. For example, data from the field on labor markets usually involves the second one, as failed negotiations are rarely observed. However, from an efficiency point of view, the former variable is the most important, for example, when deciding whether to negotiate or in deciding on whom to delegate a negotiation. To sum up, we considered all three variables: overall share of the pie or earnings, probability of reaching an agreement, and share of the pie conditional on reaching an agreement.

2.2.2 Hypotheses

The experimental design consisted of a 2 (Male Proposer, Female Proposer)$\times$2 (Male Responder, Female Responder)$\times$6 (Symmetric, Empowerment, Empowerment with past feedback, Entitlement, Entitlement with past feedback, Information) factorial design. The first two factors

[13] We actually collected data on 2,810 different negotiations, but 323 are from the *Entitlement* treatment from pairings in which no entitlement was implemented and, therefore, we dropped these observations from our data set.

allowed us to test for the existence of gender differences in each of the bargaining roles, and for the existence of gender interaction effects, by looking at the interaction Male Proposer×Male Responder. Meanwhile, the third factor allowed us to check for the role of gender as an effect modifying factor between symmetric and asymmetric bargaining environments, and between environments with and without past agreements.

Given the experimental design and treatments, we started by testing two different sets of hypotheses. Firstly, we tested for the existence of gender differences in each of the six environments considered.

We hypothesized that gender differences would be non-existent in the symmetric bargaining environment, where the 50:50 norm is prevalent (**Hypothesis 1**). Our symmetric bargaining setting is closest to the one modeled in Ma and Manove (1993), where players do not know with certainty whether their offer will be the last one. The reason is that, if they wait for too long, they might not be able to submit the offer and get a response from the other player, while if they send their offer too early, the opponent might send a counteroffer so that their offer is not the last one. In this framework, the expected division of the pie is unique and close to an even split.[14]

We hypothesized that asymmetric bargaining environments without past agreements may yield gender differences in all three environments: empowerment, entitlement, and information (**Hypotheses 2**). Note that, by making the proposer the stronger bargaining party, asymmetries break the 50:50 sharing norm but in a way that an alternative clear sharing norm is absent. This lack of clear sharing rule also allows for enough ambiguity and wiggle room for the bargaining parties to show their bargaining abilities. In particular, for the empowerment setting we decided not to provide the exact value of the outside option so as not to make that amount too salient.[15]

[14]In Ma and Manove (1993), the authors characterize a symmetric Markov-perfect equilibrium, unique at almost all nodes, in which players adopt strategic delay early in the game, make and reject offers later on, and reach agreements late in the game. In equilibrium, players miss the deadline with positive probability.

[15]In addition, we decided to ensure that the outside option would be at least 50% of the pie in order to properly implement a bargaining asymmetry through the introduction of an outside option. Note that in this case, the Nash bargaining solution (Nash Jr, 1950) and the *deal-me-out* solution (Binmore et al., 1989) return the same and, more importantly, agree on the effect of the outside option. By contrast, if the outside option was lower than 50%, these

In the entitlement setting, although it was clear the proposer was entitled to a higher share of the pie, because their productivity was higher, it was not clear how much their share of the pie should be, because the pie was determined randomly by the productivity of only one bargaining party. Finally, in the informational asymmetry, bargaining parties might expect the stronger party to try to take advantage of the informational asymmetry.

In asymmetric bargaining environments with past agreements, we intended to maintain the strength of the proposer by breaking with the 50:50 split, but in a way that a new sharing rule arises by providing bargaining parties with past agreements. Under this scenario, we hypothesized that gender differences should be less pronounced and somewhere half way between the symmetric environment and the empowerment and entitlement situations without past agreements (**Hypotheses 3**).

Secondly, given the fact that we also varied bargaining environments to change the existing ambiguity regarding the available sharing norms, we tested the null hypothesis of whether gender is an effect modifying factor when changing from a symmetric to an asymmetric bargaining environment (**Hypothesis 4**), and when changing from a bargaining situation without past agreements to a setting with information on past agreements (**Hypothesis 5**). With this in mind, we compared each of the asymmetric treatments with the *Symmetric* one, and asymmetric environments without past agreements with those with past agreements.

2.2.3 IDENTIFICATION STRATEGY

Given the interlinked nature of the outcomes described above (overall share of the pie, probability of reaching an agreement, and share of the pie conditional on reaching an agreement), we made use of Cragg's two-part model or truncated normal hurdle model (Cragg, 1971).[16]

two solution concepts disagreed on whether the existence of an outside option had any effect.

[16]More specifically, analyses were performed using the model described in equations (7) and (9) in Cragg (1971). Using the lognormal model described by equations (7) and (11) in Cragg (1971) yielded similar results. Results were also robust with respect to using the type II Tobit model proposed by Heckman (1976, 1979). Although it has the advantage of allowing for dependency between the first and the second parts, the latter model has the important disadvantage that it requires an exclusion restriction (i.e., an instrument) to properly identify the model.

Cragg's two-part model relies on the existence of a process to determine whether the outcome is positive or zero –i.e., whether the negotiation ended in agreement or not–, and on a different process to determine the participants' share of the pie conditional on reaching an agreement. Unlike the Tobit model, these processes are assumed to be independent, with each potentially depending on a different set of regressors and allowing for regressors' relative strength to vary between decisions. Thus, although in our study we used exactly the same controls in all regressions (gender of the bargaining parties, pie, period, and session fixed effects), this model allows us to potentially observe differences in the effects of gender on the success rate and on the outcome when an agreement was reached. This is important as, for example, being more aggressive during bargaining may yield lower success rates but higher outcomes if they succeed.

More formally, and omitting any subscript for the sake of exposure, let X be the vector containing the independent regressors of the model (including the gender of the proposer and the responder). The model assumes the outcome observed is $y = d \cdot y^*$, where d is a selection variable such that $d = 1$ if $X\gamma + u > 0$, $u \sim \mathcal{N}(0, 1)$ and 0 otherwise; and y^* is a latent variable modeled as $y^* = X\beta + \epsilon$ where ϵ is drawn from a truncated normal distribution that guarantees $y^* > 0$. In short, the truncated normal hurdle model estimates γ through a probit model for d, while β is estimated through a truncated normal regression for $y^* > 0$.

[Table 1 here]

An interesting aspect of two-part models is the interpretation of their coefficients, which provide us with a more comprehensive understanding of the impact of gender on bargaining. Firstly, the model allows us to compute the unconditional semi-elasticity ($S_j(y)$), i.e., the percentage change in the dependent variable generated by gender. In our case, this semi-elasticity allows us to determine the overall average effect that the gender of bargainers has on the overall share of the pie. Similarly to McDonald and Moffitt (1980), Table 1 shows how we can break down this overall average effect into two different components:

$$S_j(y) = S_j(P = 1) + S_j(y > 0) \tag{1}$$

Equation (1) shows that the total effect of variable j on the overall share of the pie, $S_j(y)$, is just the addition of the effect of variable j on the *extensive margin* $S_j(P = 1)$, i.e., on how variable j impacts on the probability of reaching an agreement, and on the *intensive margin* $S_j(y > 0)$, i.e., on how variable j impacts on the share of the pie conditional on reaching an agreement. Consequently, given this property and the straightforward interpretation of the coefficients, we will express the results as semi-elasticities.

To test hypotheses 1-3 (whether gender differences exist), we departed from the following specifications:

$$Y_{ij} = \alpha + \beta_1 MaleProp_i + \beta_2 MaleResp_j + \gamma X_{ij} + \epsilon_{ij} \quad (2)$$

$$Y_{ij} = \alpha' + \beta_1' MaleProp_i + \beta_2' MaleResp_j + \beta_3' MaleProp_i * MaleResp_j + \gamma' X_{ij} + \epsilon_{ij}' \quad (3)$$

where $MaleProp_i$ ($MaleResp_j$) takes a value of 1 if the *Proposer* i (*Responder* j) is a man and 0 for a woman. To control for the characteristics in which the bargaining between *Proposer* i and *Responder* j took place, the term X_{ij} includes session, period, and pie fixed effects. Specification (2) enables us to test whether gender differences in bargaining can be detected, i.e., whether men and women in the role of *Proposer*/*Responder* obtain different outcomes from bargaining or whether bargaining with men is different from bargaining with women. In this specification, our coefficients of interest are β_1 and β_2. Additionally, for each analysis we ran specification (3) to test whether the potential gender effect detected under specification (2) is independent of the gender of the other bargainer, i.e., whether there is any gender interaction effect. In this specification our coefficient of interest was β_3'. Thus, in the analysis, we focused on the sign and significance of the coefficients β_1, β_2, and β_3'. The estimation results for these tests are shown in Table 4.

To test hypothesis 4 (whether pure asymmetries are gender effect modifying factors), we compared gender differences in each asymmetric environment (without including the treatments with past information) with the symmetric environment by running the following regression

$$Y_{ij} = \alpha + \beta_1 MaleProp_i + \beta_2 MaleResp_j + \beta_3 Asym_{ij} + \beta_4 Asym_{ij} * MaleProp_i + \beta_5 Asym_{ij} * MaleResp_j + \gamma X_{ij} + \theta Asym_{ij} * X_{ij} + \epsilon_{ij} \quad (4)$$

while to test hypothesis 5 (whether providing past information is a gender effect modifying factors), we compared gender differences in each asymmetric environment with the ones generated under the provision of past information

$$Y_{ij} = \alpha + \beta_1 MaleProp_i + \beta_2 MaleResp_j + \beta_3 PastAgree_{ij} + \beta_4 PastAgree_{ij} * MaleProp_i + \beta_5 PastAgree_{ij} * MaleResp_j + \gamma X_{ij} + \theta PastAgree_{ij} * X_{ij} + \epsilon_{ij} \quad (5)$$

where, as before, $MaleProp_i$ ($MaleResp_j$) takes a value of 1 if the *Proposer* i (*Responder* j) is a man and 0 for a woman and X_{ij} incorporates session, period, and pie fixed effects into the analysis to control for the environment in which the bargaining took place. In regression 4, the omitted treatment is the symmetric one, while $Asym_{ij}$ takes the value of 1 if the pair ij bargained in an asymmetric environment without past agreements. In regression 5, the omitted treatment is the asymmetric one without the past agreements, while $PastAgree_{ij}$ takes the value of 1 if the pair ij bargained in an environment in which past agreements were provided. In the regressions (4 and 5) the coefficients of interest are β_4 and β_5; whose sign and significance show whether the introduction of asymmetries/past agreements indeed modify gender differences with respect to the symmetric/without past agreement environments. The estimation results for these tests are shown in Tables 5, 6, and 7.

In all specifications for bargaining outcomes, we use a two-way clustering at the subject level, that is, at the proposer and responder level simultaneously (Cameron et al., 2011; Thompson, 2011; Gu and Yoo, 2019), such that the number of clusters is the same as the number of different subjects playing the role of proposer and responder respectively.[17]

[17]Note that, for outcome variables, we have two non-nested clusters: proposers' and responders' clusters. The two-way clustering proposed in Cameron et al. (2011) allows us to account for the dependency of observations across both clusters by adding up the variance when clustering at the first cluster and when clustering at the second cluster and subtracting from this the variance when clustering at the intersection of both clusters.

2.3 Assessing the Experimental Design

We started checking for the suitability and validity of our experimental design to test for gender differences in bargaining settings that differ in their ambiguity with regard to the existing sharing norms.

We first assessed whether the pairing protocol generated a balanced gender pairing distribution. Since this study aims to look at potential gender differences and gender interaction effects in bargaining, a crucial step was to look at whether all possible gender pairings were balanced across different bargaining environments but also within each bargaining environment. While the pairings between subjects were done randomly, the role assigned to each party was not. Specifically, although not publicly revealed to subjects, within each pairing the party with the higher score in the real effort task was the one that was assigned the role of proposer (see footnote 9). However, given the gender neutrality of the real effort task, we would expect that all pairings should be evenly represented.

[Table 2 here]

This is confirmed in Table 2, where it can be checked that, within each treatment, each different pairing accounts for close to 25%, the figure expected under full randomization. It can also be checked in Table 2 that within each treatment close to 50% of the pairings have a male proposer and 50% a male responder. In order words, men and women had ex-ante equal probabilities of being assigned the strong and weak bargaining roles. This allowed us to test for the existence of gender differences and gender interaction effects in bargaining.

Next, we checked whether the *Empowerment*, *Entitlement*, and *Information* treatments generated the ambiguity we aimed for, and whether the provision of past agreements in *Empowerment* and *Entitlement* reduced the ambiguity when compared to the sessions without past agreements. The distributions of responder's share of the pie when an agreement was reached across the four different bargaining environments, showed the clearest evidence for this (Figure A3 in the Appendix A). Firstly, while there was a clear prevalence of the 50:50 sharing rule in the *Symmetric* setting, no such rule existed in the asymmetric ones. Secondly, in the absence of a clear sharing rule, the responder's pie shares showed much more variation in all three asym-

metric bargaining settings. Specifically, in the *Symmetric* bargaining environment, 69.1% of the successful negotiations in this treatment ended up in the exact 50:50 split. However, the proportion of divisions *other* than a 50:50 split in each asymmetric treatment was 99.1% for *Empowerment*, 78% for *Entitlement*, 75% for *Information*, 99% for *Empowerment* with past agreements, and 66% for *Entitlement* with past agreements. In a similar way, when comparing *Empowerment* and *Entitlement* with and without past agreements, we can see a reduction of the dispersion in the former environments, although this reduction is milder than the differences between the symmetric and the asymmetric bargaining environments.

We used two measures of dispersion to measure the existing ambiguity: the absolute value of the difference between each responder's share and the mean value of the responder's share (adjusted by treatment and pie) and the absolute value of the difference between each responder's share and the modal value of the responder's share (adjusted by treatment and pie). Table A2 in the Appendix shows the mean values of these two ambiguity measures by treatment and by pie. The ordering is clear. The symmetric bargaining environment shows the lowest ambiguity values, while the empowerment and informational asymmetric bargaining environments show the highest, followed by the entitlement. The provision of past agreements shows intermediate ambiguity values, higher than the symmetric but lower than those without the provision of past agreements.

[Table 3 here]

Table 3 shows the average treatment effect on the ambiguity in a regression analysis. As intended by the design, the results in columns (1) and (2) of Table 3 show that all three asymmetric bargaining environments increased significantly the ambiguity in implemented sharing rules, such that the dispersion is increased. The magnitude of the increase in *Entitlement* seems to be more moderate, but as can be seen at the bottom of the table, we cannot reject the fact that the magnitudes on the increased dispersion are comparable across the three asymmetric environments. In addition, columns (3) and (4) show that the provision of the modal amount agreed in *Empowerment* indeed reduces ambiguity when compared to *Empowerment* without past agreements. Finally, in a similar vein, columns (5) and (6) show that this reduction also occurred for *Entitlement*, although again this effect seems to be more moderate.

In summary, asymmetric bargaining environments led to more variation on splits of the pie, as intended. This allowed us to test whether gender is an effect modifying factor when moving from a symmetric to an asymmetric bargaining environment. In addition, the provision of past agreements in *Empowerment* and *Entitlement* did bring a reduction in ambiguity. Therefore, we would expect gender differences to be most important in the *Empowerment*, *Entitlement* and *Information* bargaining settings (without past agreements) compared to the symmetric environments. In addition, we would also expect that the provision of past agreements would decrease gender differences in the case of *Empowerment* and *Entitlement*. The treatment effects on ambiguity are strongest in *Empowerment* and most moderate in *Entitlement*, which will also be important when commenting on the results on gender differences.

3 Results

3.1 Estimation Results 1: Gender Differences and Gender Interaction Effects in Bargaining

When do men and women obtain different results in alternating-offer bargaining? When does it matter whether one bargains *with* women or men? We started by testing for gender differences and gender interaction effects in bargaining environments that differ in ambiguity with respect to sharing norms, based on the random bargaining pairing and the gender neutrality of the task.

Table 4 shows the aggregate results in the symmetric environment (panel A), in all three asymmetric environments (panel B) and in *Empowerment* and *Entitlement* environments with past agreements (panel C). The first three columns show the results for the outcomes of the proposer, while the last three columns show the results for the outcomes of the responder. Columns (2) and (5) show the results for the probability of reaching an agreement, which by definition must be the same for both player roles, but we show it twice to make the results easier to read. Columns (1) and (4) show the results for overall earnings (taking failed negotiations into account) for the proposers (column (1)) and responders (column (4)). Similarly, columns (3) and (6) show the results for the share of the pie conditional on reaching an agreement for the pro-

posers (column (3)) and responders (column (6)). Note that, as we report the semi-elasticities, coefficients should be interpreted as the percentage change in the bargaining outcome variable when having a male proposer/responder compared to a female proposer/responder. The gender coefficients in bold show the *direct effects*, namely the impact of the gender of the bargainer on their own outcomes (i.e. the effect of a male bargainer vs. a female bargainer on their own outcomes). The gender coefficients not in bold represent the *indirect effects*, namely the impact of the gender of the bargainer on the other party's outcomes (i.e. the effect of bargaining *with* a male bargainer vs. a female bargainer). It is important to differentiate between these two effects, as it might be the case that, despite not finding any evidence of gender affecting their own outcomes, we may find evidence of gender impacting other party's outcomes (or the other way around). This is only possible for overall earnings, because even though the direct and indirect effect on conditional earnings always have opposite signs, the direct and indirect effect on success rate always have the same sign.[18]

[Table 4 here]

We found no evidence for gender interaction effects (β_3') in any of the bargaining environments, so from now on we will only focus on pure gender differences in bargaining. Where there were gender differences, we observed two important patterns. Firstly, men were less likely to reach an agreement. Note that, in every environment and bargaining role, the male coefficient was systematically negative for the probability of reaching an agreement (columns (2) or (5)), impairing both men's overall earnings and the overall earning of those bargaining *with* men. This negative effect was particularly strong when men were in the weaker bargaining position in the asymmetric environments (β_2 in panel B). Secondly, the male proposers' coefficient in column (3) and male responders' coefficient in column (5) are always positive, showing that men obtain a higher share of the pie conditional on reaching an agreement. In

[18]The reason for that is that conditional earnings capture the competitive part of bargaining but success rates the cooperative part. For example, if male proposers obtain more when reaching a deal (positive direct effect), it is clear that responders will obtain less when facing a male proposer (negative indirect effect). However, if male proposers decrease the probability of reaching an agreement, this applies to both the proposer's and the responder's likelihood of reaching a deal (negative direct and indirect effect).

short, men being less likely to close a deal but being able to secure higher shares when doing it returns direct effects of gender on overall earnings that are ambiguous. However, the indirect effect is always negative, suggesting that while men do not earn more overall, bargaining *with* men is worse than bargaining *with* women.

Turning the focus to when these gender differences become significant, Table 4 also shows evidence for the hypothesized effect of ambiguity on gender differences (hypotheses 1-3). In panel A, we find no evidence for gender differences. In panel B, we find ample evidence of gender differences. When we look at the proposer's side, we see that when men close a deal, they get 6% more than women. This translates into an indirect effect such that responders when negotiating with men obtain 11.2% less than when they do with women. Since the effect of a male proposer on the probability of closing a deal is negative (although not significant), the direct effect of male proposers on overall earnings is attenuated while the indirect effect is enhanced. Thus, in an asymmetric environment and in terms of overall earnings, male proposers do not obtain significantly higher profits, but negotiating with a male proposer reduces total earnings by 14.6%. The story is similar when we turn our attention to responders. Male responders show a direct effect of 7.5% and an indirect effect of -4% but, as they make the probability of reaching an agreement fall by 10%, the direct effect on overall earnings is not significant while the indirect effect is negative and significant with a magnitude of -14%. Finally, in panel C, when past agreements are made available to bargainers in order to reduce ambiguity, all the effects on the proposer's side (direct and indirect) vanish. However, on the responder's side, we still observe that male responders obtain more when reaching a deal and that, although their lower probability of reaching an agreement is no longer significant, this translates into lower overall earnings for proposers when bargaining with male responders.

In the Appendix A, we show complementary results to those in Tables 4 but adding individual level controls, as shown in Tables A3. As one would expect, the main results hold, but they become weaker, particularly in panel B, in terms of both the magnitude and significance of gender coefficients, as mediating factors such as risk aversion and confidence are now controlled for. In other words, controlling for individual level characteristics such as confidence and risk preferences, where women are found to be more risk averse and less confident in their ability

to do the task and bargain, as shown in Table A1, attenuates the estimated gender differences in bargaining.

To sum up, where we saw gender differences, they went in the stereotypically expected direction: men proved to be tougher bargainers, bringing a higher likelihood of failure, but they obtained better deals than women when reaching an agreement. The higher likelihood of negotiation failure was especially strong in highly asymmetric bargaining environments, making it undesirable to bargain *with* men. In addition, the ability to secure a higher share of the pie when an agreement is reached is cancelled out in most cases by the always (significant or not) higher probability of failure, meaning that men and women end up with similar overall earnings. When comparing the three types of bargaining environments (symmetric, the three asymmetric environments and the asymmetric environment with past agreements), we found evidence in the hypothesized direction: gender differences are strongest in asymmetric environments (hypothesis 2), followed by asymmetric environments with past agreements (hypothesis 3), and finally in symmetric environments, where the ambiguity is lowest (hypothesis 1). We will now look at whether gender is indeed an effect modifying factor with the ambiguity manipulations.

3.2 Estimation Results 2: Gender as an Effect-Modifying Factor in Ambiguity Treatments

In the aggregate analysis, shown in Table 4, the estimated magnitudes reflect an average gender difference across all three different bargaining environments (in panel B) and in the two different bargaining environments with past agreements (in panel C). We now turn to the treatment-by-treatment analysis, to test whether gender is an effect modifying factor when ambiguity manipulations are compared across different environments. The results for the empowerment, entitlement, and informational asymmetries are presented separately, in tables 5, 6, and 7, respectively. In all three tables the results for the symmetric benchmark are repeated in panel A1, to ease the comparison across the different bargaining situations.

[Table 5 here]

Male responders were 12% less likely to reach an agreement when bargaining with an em-

powered party (Table 5, Panel A2). Therefore, for responders, men obtain an overall 15% lower share of the pie. In addition, male proposers tend to get a significantly better deal (8% higher share of the pie). However, given that they are also less likely to reach an agreement, (although not significant), these two effects cancel each other out and we find no significant effects on their overall earnings. Regarding the indirect effects, for both proposers and responders, bargaining *with* men yields lower overall earnings, up to 30% lower overall earnings for responders and 11% lower overall earnings for proposers. The picture is rather different in bargaining with an empowered party with past agreements (panel A3). In the first place, male proposers were unable to get a higher share of the pie when an agreement was reached which, together with the increase in the probability of male proposers reaching a deal, cancelled out the negative indirect effect that male proposers had on the overall earnings of responders. Regarding the responder role, although we found that male responders were able to secure a higher share of the pie when an agreement was reached, the direct effect of this on overall earnings was also cancelled out. Finally, it is worth mentioning that in this environment male responders did not increase the probability of disagreement, so we can see that gender differences were attenuated.

With regard to gender being an effect modifying factor of asymmetries, as shown in Panel B1, we found evidence that gender differences changed when moving from the symmetric to the asymmetric environment. In particular, we found that changing from a symmetric environment to a setting with an empowered party benefited male proposers more than female proposers when looking at conditional earnings. Therefore, bargaining with male proposers was significantly worse in this setting than under the symmetric one in terms of conditional earnings. When looking at the gender effects on overall earnings, we can see that these effects on conditional earnings were only significant for the indirect effect.

When including information about past agreements, the analysis confirms that it tends to attenuate the gender differences that are generated by the asymmetry as can be seen by just comparing the signs of the coefficients of Panel B2 with those of Panel B1. This is especially true for those effects concerning earnings when an agreement was reached and probabilities of reaching a deal. However, the only significant effect is that providing information fully cancels out the gender difference on responders' overall earnings.

[Table 6 here]

In bargaining with entitlement, shown in Table 6 (Panel A2), gender differences did exist but they were less significant (at a 10% significance level only) than in the empowerment environment. This is consistent with the findings in Table 3 that the ambiguity was not as high as in the *Empowerment* treatment. In general male proposers were able to secure a higher share of the pie when an agreement was reached, which generated a negative effect for responders in terms of both conditional and overall earnings.[19] In panel A3, with past agreements, the effect on proposers was no longer significant but responders were able to secure a higher share of the pie (6.8%), which was detrimental to proposers.[20] Again, we can see in Table 3 that the provision of information in *Entitlement*, although decreases ambiguity, this change was not as strong as in *Empowerment*.

As far as the test of whether gender was an effect modifying factor is concerned, even though the direction was as hypothesized, we did not find significant evidence that gender was an effect modifying factor either when comparing entitlement with the symmetric case (panel B1) or when comparing entitlement without and with past agreements (panel B2).

[Table 7 here]

Finally, in bargaining with informational asymmetries, shown in Panel A2 of Table 7, similar to the environment with empowerment, men were 10% less likely to reach an agreement

[19] We broke down negotiations with entitlement further into those where there was positive entitlement (the pie to share is that of the proposer), negative entitlement (the pie to share is that of the responder) and cases in which there was no entitlement (both the proposer and the responder had the same productivity). The only main difference between environments with positive and negative entitlements was that, in the latter, male responders were less likely to reach an agreement. With regard to cases in which there was no entitlement per se (the proposer and the responder recorded the same productivity), which should be closest to the symmetric case, we did find some gender differences. However, we believe that this last effect was due to their experience in bargaining with entitlement, meaning that this behavior might be largely contaminated by their experience in the negotiations in which there was entitlement.

[20] Note that the point estimate was still smaller when information was provided about past deals than in the entitlement without past agreements.

when they were in the weaker bargaining position. This, together with the fact that male responders obtained 13% more of the pie when an agreement was reached, was detrimental to the overall earnings of proposers, such that bargaining with men yielded 19% lower overall share of the pie than bargaining with women. For responders, this negative effect on the probability of reaching an agreement was canceled out by the higher share of the pie they obtained when they did reach an agreement.

With respect to the test of whether gender was an effect modifying factor when comparing the symmetric bargaining environment with that of with informational asymmetries, we can see that, as with entitlement, although the results were in the right direction and gender differences were attenuated, the effects did not seem to be significant.

In short, for the comparison of empowerment and symmetric bargaining environments, we can say that gender is an effect modifying factor. However, for the rest of the comparisons, although in the expected direction, we did not find hard evidence in favor of the hypothesis of gender being an effect modifying factor. We also found suggestive evidence that the provision of past agreements, in particular, in the empowerment environment, did affect gender differences in the hypothesized direction, although the effects, again, were not significant.

We perform a final test to shed some additional light on how ambiguity affects the existence and size of gender differences. In Table 3 we can see that each of the six treatments generated a bargaining environment with different degrees of ambiguity. Therefore, we can linearize this relationship by using the degree of ambiguity in each of the treatments as our variable of interest and interact it with the *Male Prop* and *Male Resp* dummies. The idea is to test whether the higher the ambiguity (abstracting from the treatment itself), the greater the gender differences in bargaining. The results in Table A4 of Appendix A show that accounting only for the degree of ambiguity generated by each treatment returns similar results to the ones described above. The results show a significant effect modifying factor if we use the distance to the mean as a measure of ambiguity, but not a significant effect modifying factor (although in the right direction) if we use the distance to the mode as a measure of ambiguity. This high consistency in the direction of the effect with the hypotheses posed in the paper further suggests the existence of a relationship between the degree of ambiguity in a bargaining environment and

the likelihood of finding gender differences.

3.3 Robustness: Experimenter Demand Effect and Deadline Effect

We performed two robustness checks. Firstly, some participants might have been responding to experimenter demand effects, given the way in which we communicated the gender of the bargaining parties. Secondly, we found a significant "*deadline effect*" such that 25% of the negotiations were still ongoing in the last 10 seconds. These two robustness tests were not included in the pre-plan analysis but, given their prevalence, we considered them important to test whether and how our main results were affected by these two effects.

3.3.1 Robustness 1: Experimenter Demand Effect

Participants were asked about their gender. Also, during the bargaining stage, participants observed both their own and their pairing's gender avatar. One potential concern with the way in which we made subjects' genders common knowledge was that this feature of the design could have yielded some type of experimenter demand effect.

It is reassuring that only 7.65% of the subjects mentioned a gender related objective and that there was no gender difference on this. Nevertheless, we replicated our main analysis, leaving out those negotiations in which *either* bargaining party mentioned that the experiment had the objective of testing for gender differences to see whether the results in Table 4 changed as a result of the presence of those participants subject to potential experimenter demand effects.

[Table 8 here]

Table 8 shows the results for the main outcome variables. Restricting the sample to those negotiations in which either bargaining party mentioned testing gender differences as an objective of the study reduced the sample from 2,487 negotiations to 2,137 (decrease of 14%). The main qualitative change from those results found in Table 4, is that male bargainers seem to have a higher probability of not reaching an agreement in symmetric bargaining environments. Therefore, we conclude that those subjects who identified the objective of testing for gender

differences in bargaining tended to show a higher likelihood of reaching an agreement. Despite the restriction, and with the exception of the change in the symmetric bargaining environment, the table shows virtually the same results as in the tables with the full data. We conclude that the main findings are robust with respect to potential experimenter demand effects.

3.3.2 Robustness 2: Deadline Effect

One consistent finding when looking at bargaining processes with fixed time limit was the so called "*deadline effect*". This has been shown to shift a substantial number of agreements toward the deadline, delaying the whole process. This effect has been widely documented both with field data (e.g., Cramton and Tracy, 1992) and in the lab (e.g., Roth et al., 1988; Gächter and Riedl, 2005).[21] The existence of this deadline effect is important, not only because delays in reaching agreements may generate inefficiencies but also because they seem to be caused by bargainers for strategic reasons (Sterbenz and Phillips, 2001; Gneezy et al., 2003).

[Figure 5 here]

As shown by Figure 5, our experimental data shows substantial deadline effects, which are consistent with previous findings: 36.7% of negotiations (907 out of 2,487) were still ongoing in the last 10 seconds –i.e., one bargaining party made a new proposal within that time window.[22] Specifically, 26.7% of the 2,116 successful negotiations were closed within the last 10 seconds, and the proportion was similar across different bargaining environments (22% in the symmetric environment, 23% for empowerment, 29% entitlement, 32% for informational asymmetries, 21% for empowerment with past agreements, and 29% for entitlement with past agreements).

[21] The deadline effect is not exclusive to bargaining settings. It has also been documented in auctions, both in the field (Roth et al., 2002) and in the lab (Ariely et al., 2005). This is especially surprising because both Roth et al. (2002) in the field and Ariely et al. (2005) in the lab use data from second-bid auctions, in which there are no strategic reasons to delay as there could be in a bargaining setting.

[22] The proportion of deals closed in an ultimatum situation is similar to that typically found in previous literature. For example, using data from 4 different experiments with a total of 1,237 observations, Roth et al. (1988) found that the percentage of deals closed within the last 10 seconds was 28.3%, which is similar to our overall figure of 26.5%.

Note that as the timing of new proposals approaches the deadline, they can be considered as equivalent to take-it-or-leave-it proposals, as the chances of effectively making a counter-proposal in the remaining time becomes very small. The receiver is thus obliged to accept the proposal or let the bargaining fail. Thus, we have identified and refer here to proposals (regardless of whether they are offers or demands) made within the last 10 seconds as *ultimatums*. In line with this classification, Table A5 in Appendix A shows that, in *ultimatum* agreements, the final split of the pie is affected by whether the last proposal is a demand or an offer, but not in the case of non-*ultimatum* agreements.

In light of this existence of the so called *deadline effect*, two questions arise. Firstly, given that bargaining parties might self-select into an ultimatum bargaining environment, it is advisable to test for gender differences in the likelihood of ending up in an *ultimatum* type of bargaining process. Table 9 looks at gender differences on the propensity for closing a deal via an *ultimatum* in each of the six treatments. The results suggest that a bargaining pairing involving men is more likely in general to close a deal of this type.[23] This finding is particularly consistent across different treatments for male responders, while for male proposers it seems to be driven mainly by the empowerment environment. This is also consistent with the findings in Tables 4, 5, and 7 that men are tougher bargainers and have a higher likelihood of failure.

[Table 9 here]

Secondly, and more importantly, since our results show that *ultimatum* deals are different from non-*ultimatum* ones in terms of how the pie is split (Table A5 in Appendix A), next we excluded from our sample all *ultimatum* agreements, to see whether the results in Table 4 are biased by the presence of these deals reached in the last 10 seconds. Table 10 shows the results. The sample reduced considerably, from 2,487 negotiations to 1,922 negotiations. Despite this reduction, the table shows virtually the same results as in the tables with the full data. If anything, when there are gender differences, they become even higher in magnitude and the significance levels also slightly increase.

[23] Interestingly, complementary analysis shows that the results in Table 9 come from men tending to *make* more *ultimatum* type offers and not from receiving them.

[Table 10 here]

To sum up, this section shows that limiting bargaining to a fixed duration yields a significant deadline effect, which has an impact on how the pie is split. Although this does not seem to affect the magnitude and significance of the gender differences found, ideally we would like to get rid of the deadline effect, as it is more of an artifact due to the exogenous time limit implemented in the laboratory. Future research seeking to understand gender differences and gender interaction effects should be directed at removing the deadline effect. However, the methodology used in experiments to get rid of the deadline effect comes at a cost.[24] Most importantly, our results show that the stereotypically expected gender differences are not due to the existence of the so-called deadline effect, but are present and indeed found mainly in those agreements that are not reached close to the deadline.

4 Discussion

In this paper, we have addressed the question of when gender differences in bargaining will be more likely to exist. We proposed an experimental design that varied bargaining environments with the goal of changing ambiguity regarding the sharing norm, to test whether the higher the ambiguity, the more likely and stronger the observed gender differences.

We found that gender differences were absent in symmetric settings, where a 50:50 split is the norm, but they became significant when asymmetries between bargaining roles were introduced. Furthermore, all the gender differences detected were in the stereotypically expected direction, namely that men made reaching an agreement harder, and, if anything, they obtained a higher share of the pie when reaching an agreement. Although the latter result resonates with the stereotypically expected behavior, the former result, i.e., men ending up with a higher likelihood of failure (also found by Eckel and Grossman, 2001; Sutter et al., 2009b; Andersen et al., 2018), has not been stressed enough in our opinion, despite having important consequences for

[24] Two alternatives to fixed time limit are random stopping time (e.g., Dittrich et al., 2014) and shrinking pie in real time (e.g., in Embrey et al., 2014). As men and women are known to differ in their risk preferences, these alternative methodologies might yield major gender differences in bargaining due to their different risk aversion levels, so we decided to stick to the fixed time limit.

efficiency. This finding is important, because it shows that when looking at *overall earnings*, men and women may obtain the same results from bargaining for themselves (*direct effect*), but men tend to decrease other people's earnings by reducing the efficiency of the bargaining (*indirect effect*). Finally, even in asymmetric environments, when past agreements were provided to decrease existing ambiguity, the effect of men having a higher likelihood of not reaching an agreement proved to be no longer significant. We found evidence that bargaining environments with high ambiguity were more likely to yield gender differences, but were attenuated in bargaining environments with lower ambiguity. However, we did not find any hard evidence (except under the *Empowerment* treatment) for gender being an effect modifying factor.

What did we learn about real-life negotiations? We argue that most, if not all, bargaining situations in economically relevant situations, such as in wage negotiations in labor markets, are not only asymmetric but they also have enough wiggle room to allow men and women to get different outcomes. The counterexample would be a firm in which salaries for each of the positions are fully transparent and there is no room for negotiation (Hospido et al., 2019), where one would not expect bargaining to play any role in setting wages.

Future research should look to study how much wiggle room is needed to be able to detect these gender differences. Note that our study shows that ambiguity is a *necessary* condition for gender differences to flourish, although even in asymmetric environments it is possible to reduce ambiguity by providing bargaining parties with past agreements, which may serve as reference points.

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FIGURES

FIGURE 1– TREATMENTS: VARYING AMBIGUITY IN THE SHARING RULES

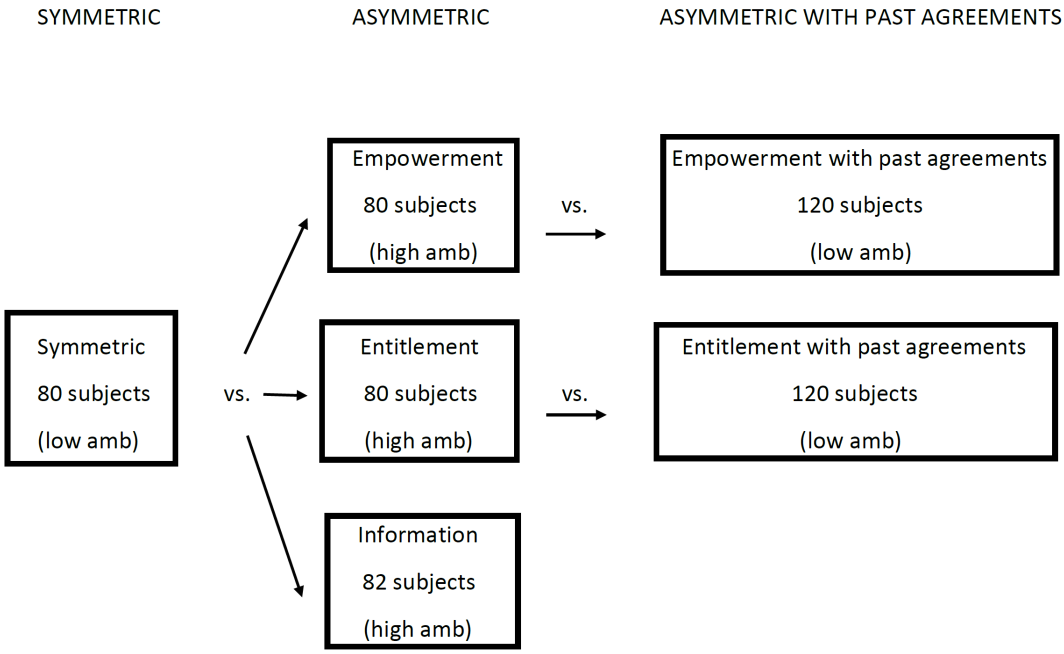


FIGURE 2– EXAMPLE OF A MATRIX SHOWN TO SUBJECTS DURING THE REAL EFFORT TASK

0	1	1	0	1	1
0	1	1	0	0	1
0	0	0	1	1	1
1	0	0	0	0	0
1	1	0	0	1	0
0	0	0	1	0	0

FIGURE 3– GENDER AVATARS

FIGURE 4– SCREEN SEEN BY PROPOSERS DURING THE BARGAINING TASK (SYMMETRIC ENVIRONMENT)

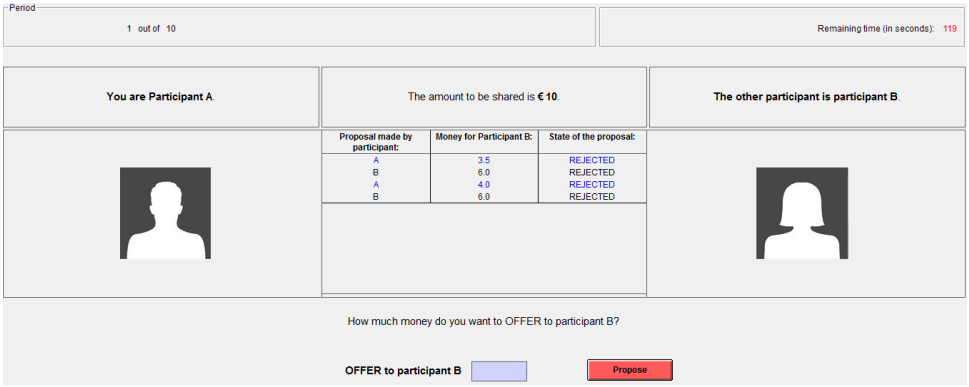
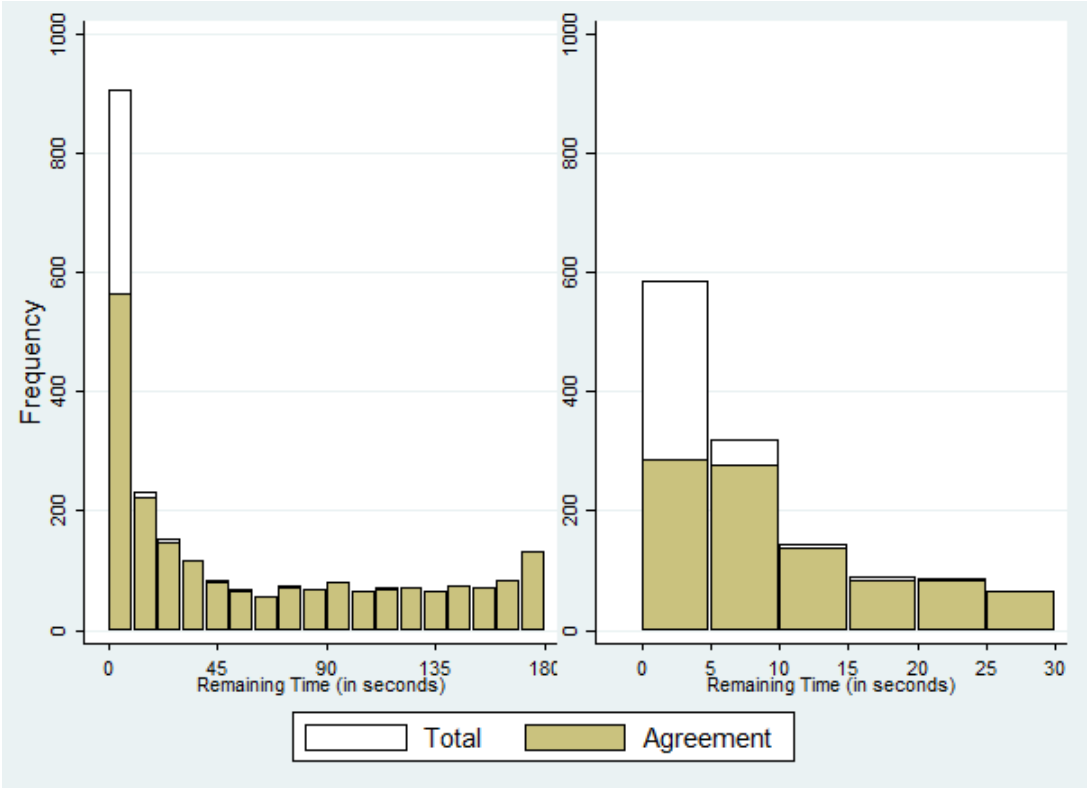


FIGURE 5– DEADLINE EFFECT



Notes: Distribution of the last proposals (offer or demand) over time in seconds. *Total* refers to the total number of pairings that made their last proposal in a given time window. An *Agreement* refers to the number of pairings that made their last proposal in a given time window *and* are accepted.

TABLES

TABLE 1– EXPECTATIONS AND SEMI-ELASTICITIES

$E(y\|X)$	$\Phi(X\gamma)\left[X\beta+\sigma\lambda(X\beta/\sigma)\right]$	
$P(y>0\|X)$	$\Phi(X\gamma)$	
$E(y\|X,y>0)$	$X\beta+\sigma\lambda(X\beta/\sigma)$	
$S_j(y)=\frac{\partial E(y\|X)/\partial x_j}{E(y\|X)}$	$\gamma_j\lambda(X\gamma)+\frac{\beta_j\theta(X\beta/\sigma)}{X\beta+\sigma\lambda(X\beta/\sigma)}$	Total Effect
$S_j(P=1)=\frac{\partial P(y>0\|X)/\partial x_j}{P(y>0\|X)}$	$\gamma_j\lambda(X\gamma)$	Extensive Margin
$S_j(y>0)=\frac{\partial E(y\|X,y>0)/\partial x_j}{E(y\|X,y>0)}$	$\frac{\beta_j\theta(X\beta/\sigma)}{X\beta+\sigma\lambda(X\beta/\sigma)}$	Intensive Margin

Notes: $\Phi(.)$ denotes the cumulative normal distribution function, $\phi(.)$ its density function, $\lambda(.)=\frac{\phi(.)}{\Phi(.)}$ the inverse Mills ratio, and $\theta(z)=1-\lambda(z)[z+\lambda(z)]$. Coefficients from the probit are denoted by γ, and coefficients from the truncated normal regression by β. σ is the standard deviation of the random component ϵ. For further details, see Wooldridge (2002).

TABLE 2– DISTRIBUTION OF GENDER PAIRINGS ACROSS AND WITHIN EACH BARGAINING ENVIRONMENT

	Symmetric	Empowerment		Entitlement		Information
		No Past Agree.	Past Agree.	No Past Agree.	Past Agree.	
FF	24.50%	24.25%	25.17%	22.52%	26.02%	25.85%
MF	24.25%	25.50%	30.17%	20.61%	26.75%	28.05%
FM	26.75%	26.00%	22.83%	30.92%	21.45%	22.68%
MM	24.50%	24.25%	21.83%	25.95%	25.78%	23.41%
Male Proposer	48.75%	49.75%	52.00%	46.56%	52.53%	51.46%
Male Responder	51.25%	50.25%	44.67%	56.87%	47.23%	46.10%
Observations	400	400	600	262	415	410

TABLE 3– AVERAGE TREATMENT EFFECT ON AMBIGUITY

	Symmetric vs. Asymmetric		Emp. without vs. with Past Agreements		Ent. without vs. with Past Agreements	
	Dist_Mean	Dist_Mode	Dist_Mean	Dist_Mode	Dist_Mean	Dist_Mode
	(1)	(2)	(3)	(4)	(5)	(6)
Empowerment	0.0476***	0.0635***				
	(0.0148)	(0.0194				
Entitlement	0.0292	0.0452**				
	(0.0192)	(0.0213)				
Information	0.0403**	0.0582***				
	(0.0188)	(0.0222)				
Past Agreements			-0.0366***	-0.0541***	-0.0117	-0.0287
			(0.0106)	(0.0154)	(0.0168)	(0.0204)
Observations	1,263	1,263	844	844	577	577
R-squared	0.088	0.112	0.114	0.118	0.051	0.056
H_0: Emp=Ent	0.2159	0.3773				
H_0: Emp=Inf	0.5955	0.8052				
H_0: Ent=Inf	0.5469	0.5720				

Notes: OLS for the mean effect of each treatment on *Dist_Mean* and *Dist_Mode* for successful agreements. *Dist_Mean* is the absolute difference between the responder's share and the mean value of the responder's share by treatment and pie. *Dist_Mode* is the absolute difference between the responder's share and the mode of the responder's share by treatment and pie. The omitted environment in columns (1) and (2) is *Symmetric*, while in columns (3) to (6) is the bargaining environment without past agreements. All regressions control for *Pie Size*, *Period* and *Session* fixed effects. Standard errors are clustered at the subject level using two-way clustering. *** p<0.01, ** p<0.05, * p<0.1

TABLE 4– GENDER AND GENDER INTERACTION EFFECTS: AGGREGATE ANALYSIS

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: SYMMETRIC						
β_1: Male Prop	**-0.0265**	**-0.0349**	**0.00837**	-0.0432	-0.0349	-0.00832
	(0.0517)	**(0.0436)**	**(0.0287)**	(0.0521)	(0.0436)	(0.0286)
β_2: Male Resp	-0.0905	-0.0466	-0.0439	**-0.00290**	**-0.0466**	**0.0437**
	(0.0633)	(0.0470)	(0.0329)	**(0.0502)**	**(0.0470)**	**(0.0323)**
β_3': Male#Male	0.0693	0.0393	0.0299	0.00961	0.0393	-0.0297
	(0.0913)	(0.0557)	(0.0555)	(0.0631)	(0.0556)	(0.0549)
Observations	400	400	400	400	400	400
Clusters	80	80	80	80	80	80
PANEL B: ASYMMETRIC						
β_1: Male Prop	**0.0262**	**-0.0339**	**0.0601*****	-0.146***	-0.0339	-0.112***
	(0.0335)	**(0.0268)**	**(0.0229)**	(0.0535)	(0.0268)	(0.0434)
β_2: Male Resp	-0.140***	-0.0991***	-0.0405**	**-0.0236**	**-0.0991*****	**0.0755****
	(0.0361)	(0.0288)	(0.0185)	**(0.0418)**	**(0.0289)**	**(0.0343)**
β_3': Male#Male	0.0460	0.0321	0.0139	0.00813	0.0321	-0.0240
	(0.0588)	(0.0524)	(0.0282)	(0.0754)	(0.0524)	(0.0523)
Observations	1,072	1,072	1,072	1,072	1,072	1,072
# Clusters	242	242	242	242	242	242
PANEL C: ASYMMETRIC WITH PAST AGREEMENTS						
β_1: Male Prop	**0.00898**	**-0.0124**	**0.0214**	-0.0617	-0.0124	-0.0494
	(0.0318)	**(0.0298)**	**(0.0172)**	(0.0537)	(0.0298)	(0.0399)
β_2: Male Resp	-0.0943**	-0.0522	-0.0420***	**0.0441**	**-0.0522**	**0.0963*****
	(0.0374)	(0.0320)	(0.0129)	**(0.0381)**	**(0.0320)**	**(0.0300)**
β_3': Male#Male	0.0301	0.00135	0.0288	-0.0643	0.00135	-0.0657
	(0.0561)	(0.0554)	(0.0223)	(0.0812)	(0.0554)	(0.0509)
Observations	1,015	1,015	1,015	1,015	1,015	1,015
# Clusters	240	240	240	240	240	240

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for each bargaining environment, *Pie Size*, *Period*, and *Session* fixed effects. All fixed effects are interacted with each bargaining environments. Direct effects displayed in **bold**. Standard errors are clustered at subject level using two-way clustering. *** p<0.01, ** p<0.05, * p<0.1

TABLE 5– GENDER DIFFERENCES BY BARGAINING SETTING: EMPOWERMENT

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: GENDER DIFFERENCES BY BARGAINING ENVIRONMENT						
PANEL A1: SYMMETRIC						
β_1: Male Prop	**-0.0265**	**-0.0349**	**0.00837**	-0.0432	-0.0349	-0.00832
	(0.0517)	**(0.0436)**	**(0.0287)**	(0.0521)	(0.0436)	(0.0286)
β_2: Male Resp	-0.0905	-0.0466	-0.0439	**-0.00290**	**-0.0466**	**0.0437**
	(0.0633)	(0.0470)	(0.0329)	**(0.0502)**	**(0.0470)**	**(0.0323)**
Observations	400	400	400	400	400	400
Clusters	80	80	80	80	80	80
PANEL A2: EMPOWERMENT						
β_1: Male Prop	**0.0253**	**-0.0565**	**0.0818****	-0.301**	-0.0565	-0.245**
	(0.0534)	**(0.0487)**	**(0.0339)**	(0.123)	(0.0487)	(0.104)
β_2: Male Resp	-0.117*	-0.125**	0.00793	**-0.149***	**-0.125****	**-0.0234**
	(0.0676)	(0.0578)	(0.0244)	**(0.0818)**	**(0.0578)**	**(0.0724)**
Observations	400	400	400	400	400	400
# Clusters	80	80	80	80	80	80
PANEL A3: EMPOWERMENT WITH PAST AGREEMENTS						
β_1: Male Prop	**0.0425**	**0.0117**	**0.0308**	-0.0961	0.0117	-0.108
	(0.0419)	**(0.0413)**	**(0.0202)**	(0.0904)	(0.0413)	(0.0720)
β_2: Male Resp	-0.105*	-0.0740	-0.0312**	**0.0342**	**-0.0740**	**0.108****
	(0.0550)	(0.0477)	(0.0149)	**(0.0556)**	**(0.0477)**	**(0.0514)**
Observations	600	600	600	600	600	600
# Clusters	120	120	120	120	120	120
PANEL B: GENDER AS EFFECT MODIFYING FACTOR						
PANEL B1: SYMMETRIC VS EMPOWERMENT						
β_4: Male Prop#Asym	**0.0760**	**-0.0192**	**0.0953****	-0.196*	-0.0192	-0.177**
	(0.0732)	**(0.0655)**	**(0.0457)**	(0.115)	(0.0655)	(0.0841)
β_5: Male Resp#Asym	-0.0276	-0.0741	0.0465	**-0.154***	**-0.0741**	**-0.0800**
	(0.0857)	(0.0673)	(0.0397)	**(0.0852)**	**(0.0673)**	**(0.0702)**
Observations	800	800	800	800	800	800
# Clusters	160	160	160	160	160	160
PANEL B2: EMPOWERMENT WITH VS WITHOUT PAST AGREEMENTS						
β_4: Male Prop#Past	**0.0203**	**0.0692**	**-0.0489**	0.220	0.0692	0.150
	(0.0671)	**(0.0640)**	**(0.0385)**	(0.152)	(0.0640)	(0.125)
β_5: Male Resp#Past	0.0150	0.0545	-0.0395	**0.184***	**0.0545**	**0.130**
	(0.0834)	(0.0711)	(0.0273)	**(0.0947)**	**(0.0711)**	**(0.0876)**
Observations	1000	1000	1000	1000	1000	1000
# Clusters	200	200	200	200	200	200

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for *Pie Size*, *Period* and *Session* fixed effects. Standard errors are clustered at subject level using two-way clustering. Direct effects displayed in **bold**. *** p<0.01, ** p<0.05, * p<0.1

TABLE 6– GENDER DIFFERENCES BY BARGAINING SETTING: ENTITLEMENT

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: GENDER DIFFERENCES BY BARGAINING ENVIRONMENT						
PANEL A1: SYMMETRIC						
β_1: Male Prop	**-0.0265**	**-0.0349**	**0.00837**	-0.0432	-0.0349	-0.00832
	(0.0517)	**(0.0436)**	**(0.0287)**	(0.0521)	(0.0436)	(0.0286)
β_2: Male Resp	-0.0905	-0.0466	-0.0439	**-0.00290**	**-0.0466**	**0.0437**
	(0.0633)	(0.0470)	(0.0329)	**(0.0502)**	**(0.0470)**	**(0.0323)**
Observations	400	400	400	400	400	400
Clusters	80	80	80	80	80	80
PANEL A2: ENTITLEMENT						
β_1: Male Prop	**0.0327**	**-0.0385**	**0.0712***	-0.126*	-0.0385	-0.0880*
	(0.0604)	**(0.0463)**	**(0.0406)**	(0.0698)	(0.0463)	(0.0503)
β_2: Male Resp	-0.114	-0.0531	-0.0606	**0.0218**	**-0.0531**	**0.0748**
	(0.0700)	(0.0537)	(0.0417)	**(0.0716)**	**(0.0537)**	**(0.0508)**
Observations	262	262	262	262	262	262
# Clusters	80	80	80	80	80	80
PANEL A3: ENTITLEMENT WITH PAST AGREEMENTS						
β_1: Male Prop	**-0.0510**	**-0.0511**	**9.92e-05**	-0.0513	-0.0511	-0.000116
	(0.0464)	**(0.0431)**	**(0.0255)**	(0.0562)	(0.0431)	(0.0298)
β_2: Male Resp	-0.0755*	-0.0166	-0.0590**	**0.0523**	**-0.0166**	**0.0689****
	(0.0439)	(0.0368)	(0.0240)	**(0.0468)**	**(0.0368)**	**(0.0291)**
Observations	415	415	415	415	415	415
# Clusters	120	120	120	120	120	120
PANEL B: GENDER AS EFFECT MODIFYING FACTOR						
PANEL B1: SYMMETRIC VS ENTITLEMENT						
β_4: Male Prop#Asym	**0.0599**	**-0.00789**	**0.0678**	-0.0814	-0.00789	-0.0735
	(0.0780)	**(0.0626)**	**(0.0479)**	(0.0822)	(0.0626)	(0.0519)
β_5: Male Resp#Asym	-0.0346	-0.0123	-0.0223	**0.0119**	**-0.0123**	**0.0242**
	(0.0935)	(0.0702)	(0.0521)	**(0.0834)**	**(0.0702)**	**(0.0566)**
Observations	662	662	662	662	662	662
# Clusters	160	160	160	160	160	160
PANEL B2: ENTITLEMENT WITH VS WITHOUT PAST AGREEMENTS						
β_4: Male Prop#Past	**-0.0750**	**-0.00281**	**-0.0722**	0.0834	-0.00281	0.0862
	(0.0736)	**(0.0617)**	**(0.0469)**	(0.0876)	(0.0617)	(0.0558)
β_5: Male Resp#Past	0.0490	0.0459	0.00311	**0.0422**	**0.0459**	**-0.00373**
	(0.0866)	(0.0704)	(0.0467)	**(0.0875)**	**(0.0704)**	**(0.0557)**
Observations	677	677	677	677	677	677
# Clusters	200	200	200	200	200	200

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for *Pie Size*, *Period* and *Session* fixed effects. Standard errors are clustered at subject level using two-way clustering. Direct effects displayed in **bold**. *** p<0.01, ** p<0.05, * p<0.1

TABLE 7– GENDER DIFFERENCES BY BARGAINING SETTING: INFORMATION

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: GENDER DIFFERENCES BY BARGAINING ENVIRONMENT						
PANEL A1: SYMMETRIC						
β_1: Male Prop	**-0.0265**	**-0.0349**	**0.00837**	-0.0432	-0.0349	-0.00832
	(0.0517)	**(0.0436)**	**(0.0287)**	(0.0521)	(0.0436)	(0.0286)
β_2: Male Resp	-0.0905	-0.0466	-0.0439	**-0.00290**	**-0.0466**	**0.0437**
	(0.0633)	(0.0470)	(0.0329)	**(0.0502)**	**(0.0470)**	**(0.0323)**
Observations	400	400	400	400	400	400
Clusters	80	80	80	80	80	80
PANEL A2: INFORMATION						
β_1: Male Prop	**0.0150**	**-0.00847**	**0.0235**	-0.0439	-0.00847	-0.0354
	(0.0593)	**(0.0383)**	**(0.0430)**	(0.0730)	(0.0383)	(0.0642)
β_2: Male Resp	-0.189***	-0.103***	-0.0864***	**0.0267**	**-0.103*** **	**0.130*** **
	(0.0473)	(0.0336)	(0.0307)	**(0.0521)**	**(0.0336)**	**(0.0444)**
Observations	410	410	410	410	410	410
# Clusters	82	82	82	82	82	82
PANEL B: GENDER AS EFFECT MODIFYING FACTOR						
PANEL B1: SYMMETRIC VS INFORMATION						
β_4: Male Prop#Asym	**0.0435**	**0.0257**	**0.0178**	0.00344	0.0257	-0.0223
	(0.0776)	**(0.0574)**	**(0.0500)**	(0.0827)	(0.0574)	(0.0617)
β_5: Male Resp#Asym	-0.112	-0.0587	-0.0530	**0.00803**	**-0.0587**	**0.0667**
	(0.0731)	(0.0520)	(0.0426)	**(0.0664)**	**(0.0520)**	**(0.0522)**
Observations	810	810	810	810	810	810
# Clusters	162	162	162	162	162	162

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for *Pie Size*, *Period* and *Session* fixed effects. Standard errors are clustered at subject level using two-way clustering. Direct effects displayed in **bold**. *** p<0.01, ** p<0.05, * p<0.1

TABLE 8– GENDER DIFFERENCES AND GENDER INTERACTION EFFECTS ROBUST WITH RESPECT TO EXPERIMENTER DEMAND EFFECTS

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: SYMMETRIC						
β_1: Male Prop	**-0.0922***	**-0.106****	**0.0138**	-0.120*	-0.106**	-0.0138
	(0.0520)	**(0.0480)**	**(0.0342)**	(0.0650)	(0.0480)	(0.0341)
β_2: Male Resp	-0.137**	-0.0825*	-0.0540	**-0.0285**	**-0.0825***	**0.0540**
	(0.0659)	(0.0464)	(0.0371)	**(0.0515)**	**(0.0464)**	**(0.0355)**
β_3': Male#Male	0.0558	0.115*	-0.0593	0.101	0.115*	-0.0144
	(0.0875)	(0.0633)	(0.0584)	(0.116)	(0.0642)	(0.0944)
Observations	324	324	324	324	324	324
# Clusters	72	72	72	72	72	72
PANEL B: ASYMMETRIC WITHOUT PAST AGREEMENTS						
β_1: Male Prop	**0.00509**	**-0.0424**	**0.0475****	-0.134**	-0.0424	-0.0915**
	(0.0381)	**(0.0302)**	**(0.0239)**	(0.0567)	(0.0302)	(0.0462)
β_2: Male Resp	-0.144***	-0.0972***	-0.0466**	**-0.00728**	**-0.0972*****	**0.0899****
	(0.0377)	(0.0329)	(0.0189)	**(0.0482)**	**(0.0329)**	**(0.0356)**
β_3': Male#Male	0.104	0.0762	0.0282	0.0480	0.0762	-0.0282
	(0.0947)	(0.0676)	(0.0638)	(0.0910)	(0.0676)	(0.0633)
Observations	888	888	888	888	888	888
# Clusters	218	218	218	218	218	218
PANEL C: ASYMMETRIC WITH PAST AGREEMENTS						
β_1: Male Prop	**0.0263**	**0.00689**	**0.0194**	-0.0385	0.00689	-0.0454
	(0.0323)	**(0.0301)**	**(0.0189)**	(0.0583)	(0.0301)	(0.0448)
β_2: Male Resp	-0.0742*	-0.0371	-0.0371***	**0.0492**	**-0.0371**	**0.0863*****
	(0.0395)	(0.0334)	(0.0133)	**(0.0386)**	**(0.0334)**	**(0.0313)**
β_3': Male#Male	0.0267	0.00469	0.0220	-0.0468	0.00469	-0.0515
	(0.0564)	(0.0552)	(0.0217)	(0.0797)	(0.0552)	(0.0505)
Observations	925	925	925	925	925	925
# Clusters	229	229	229	229	229	229

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for each bargaining environment, *Pie Size*, *Period* and *Session* fixed effects. All fixed effects are interacted with each bargaining environments. Clustered standard errors at participant level using two-way clustering. Direct effects displayed in **bold**. *** p<0.01, ** p<0.05, * p<0.1

TABLE 9– PROBABILITY OF REACHING AN ULTIMATUM

Panel A: Gender Differences in the Likelihood of Reaching an *Ultimatum*

	Overall	Symmetric	Empowerment	Entitlement	Information	Empowerment Past Agree.	Entitlement Past Agree.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β_1: Male Prop	0.215**	0.170	0.812***	0.161	0.194	0.400**	0.0854
	(0.0912)	(0.170)	(0.214)	(0.185)	(0.177)	(0.181)	(0.140)
β_2: Male Resp	0.344***	0.209	0.545**	0.375	0.515***	0.554**	0.246*
	(0.103)	(0.195)	(0.251)	(0.249)	(0.186)	(0.218)	(0.140)
Observations	2,487	400	400	262	410	600	415
# Clusters	562	80	80	80	82	120	120

Panel B: Gender Differences in the Likelihood of Closing an *Ultimatum* Agreement

	Overall	Symmetric	Empowerment	Entitlement	Information	Empowerment Past Agree.	Entitlement Past Agree.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β_1: Male Prop	0.314**	0.135	1.124***	0.116	0.380*	0.765***	0.0617
	(0.126)	(0.212)	(0.287)	(0.289)	(0.218)	(0.256)	(0.199)
β_2: Male Resp	0.371***	0.176	0.553**	0.376	0.531**	0.631**	0.306*
	(0.137)	(0.296)	(0.270)	(0.303)	(0.242)	(0.285)	(0.168)
Observations	2,116	343	339	229	352	505	348
# Clusters	562	80	80	80	82	120	120

Notes: Probit for the probability of reaching the last the last 10 seconds without a deal (Panel A) and for closing a deal in the last 10 seconds (Panel B). Semi-elasticities are displayed. All regressions control for *Pie Size* and include *Period* and *Session* fixed effects. Standard errors are clustered at the participant level using two-way clustering. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 10– GENDER DIFFERENCES AND GENDER INTERACTION EFFECTS IN NON-ULTIMATUM AGREEMENTS

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: SYMMETRIC						
β_1: Male Prop	-0.0394	-0.0444	0.00502	-0.0494	-0.0444	-0.00497
	(0.0672)	(0.0571)	(0.0317)	(0.0633)	(0.0571)	(0.0314)
β_2: Male Resp	-0.105	-0.0612	-0.0434	-0.0183	-0.0612	0.0429
	(0.0760)	(0.0590)	(0.0367)	(0.0620)	(0.0590)	(0.0361)
β_3': Male#Male	0.114	0.0730	0.0414	0.0320	0.0730	-0.0410
	(0.103)	(0.0602)	(0.0681)	(0.0764)	(0.0602)	(0.0667)
Observations	325	325	325	325	325	325
Clusters	80	80	80	80	80	80
PANEL B: ASYMMETRIC						
β_1: Male Prop	-0.0106	-0.0732*	0.0625**	-0.188**	-0.0732*	-0.115**
	(0.0457)	(0.0397)	(0.0297)	(0.0736)	(0.0397)	(0.0557)
β_2: Male Resp	-0.212***	-0.169***	-0.0431**	-0.0893	-0.169***	0.0797**
	(0.0561)	(0.0486)	(0.0214)	(0.0566)	(0.0486)	(0.0391)
β_3': Male#Male	0.0285	0.0169	0.0116	-0.00251	0.0169	-0.0194
	(0.0808)	(0.0728)	(0.0351)	(0.0973)	(0.0728)	(0.0646)
Observations	816	816	816	816	816	816
# Clusters	242	242	242	242	242	242
PANEL C: ASYMMETRIC WITH PAST AGREEMENTS						
β_1: Male Prop	-0.0274	-0.0410	0.0136	-0.0727	-0.0410	-0.0317
	(0.0442)	(0.0437)	(0.0192)	(0.0682)	(0.0437)	(0.0446)
β_2: Male Resp	-0.145***	-0.100**	-0.0444***	0.00164	-0.100**	0.102***
	(0.0528)	(0.0467)	(0.0154)	(0.0509)	(0.0467)	(0.0354)
β_3': Male#Male	0.0133	-0.00360	0.0169	-0.0419	-0.00360	-0.0383
	(0.0797)	(0.0771)	(0.0285)	(0.106)	(0.0772)	(0.0656)
Observations	781	781	781	781	781	781
# Clusters	240	240	2409	240	240	240

Notes: Cragg's truncated hurdle model for the pie share captured by proposer (columns (1)-(3)) and responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for *Pie Size*, *Period* and *Session* fixed effects. Standard errors are clustered at *Proposer* and *Responder* level using two-way clustering.*** p<0.01, ** p<0.05, * p<0.1

A Appendix: Additional Figures and Tables

Figure A1– Gender Nature of the Real Effort Task

Notes: Histogram for perceived gender nature of the task by gender.

Figure A2– Gender Nature of the Bargaining

Notes: Histogram for perceived gender nature of bargaining by gender.

TABLE A1– DESCRIPTIVE STATISTICS

	Women (N=284) (1)	Men (N=278) (2)	*p*-value (3)
Self-Assessed Rank (Task)	2.26	2.09	0.0234
	(0.93)	(0.92)	
Real Rank (Task)	2.44	2.40	0.6904
	(1.11)	(1.11)	
Real−Self-Assessed Rank (Task)	0.17	0.31	0.0782
	(1.02)	(0.86)	
Self-Assessed Rank (Bargaining)	2.64	2.43	0.0063
	(0.88)	(0.93)	
Real Rank (Bargaining)	2.53	2.49	0.6537
	(1.11)	(1.13)	
Real−Self-Assessed Rank (Bargaining)	-0.11	0.06	0.0432
	(0.96)	(0.99)	
Risk Preferences	3.34	4.17	0.0000
	(1.74)	(2.07)	
SVO angle	20.06	20.88	0.4857
	(12.77)	(14.88)	

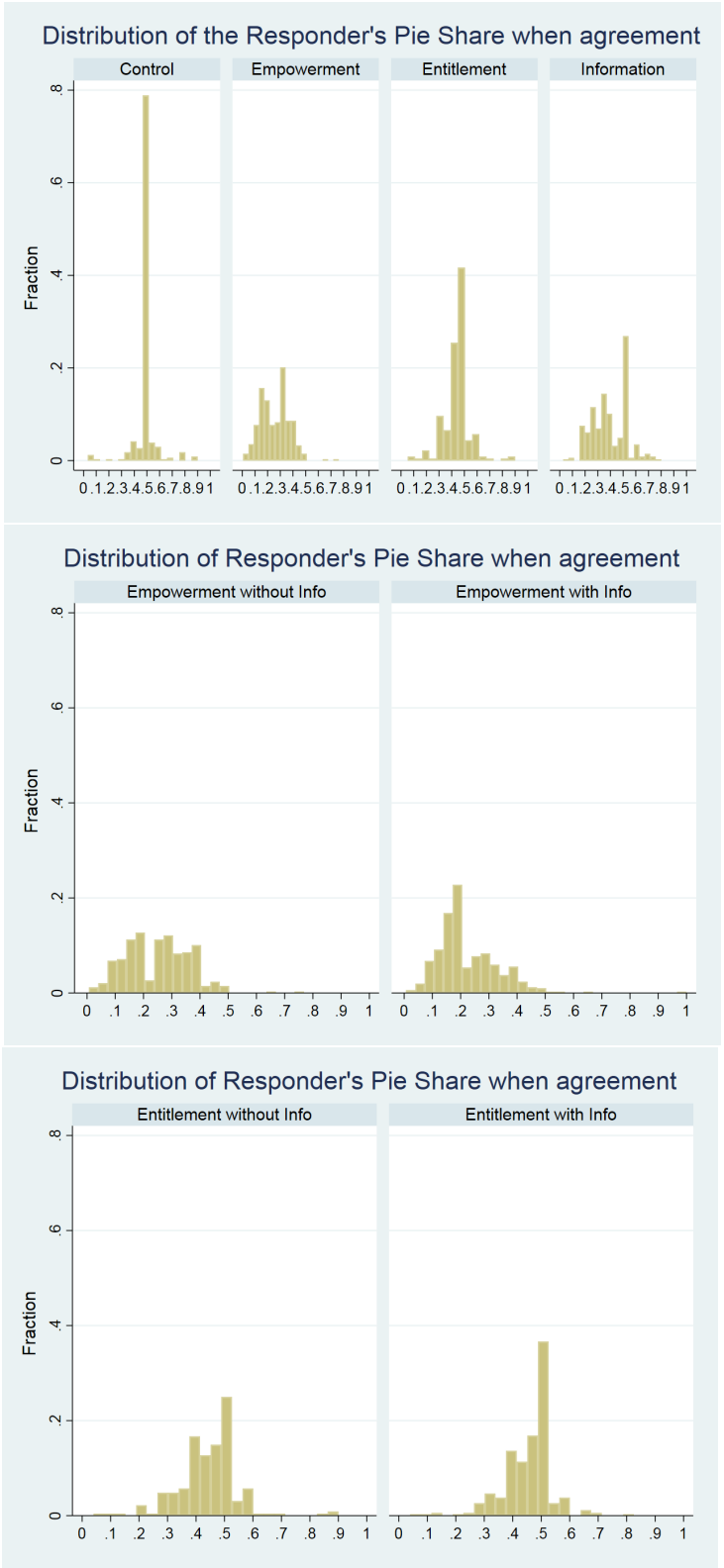
Notes: Mean values and standard deviations (in parentheses) for individual control variables by gender. *Self-Assessment (Task)* refers to the self-reported rank in the real effort task and takes values 1 (top quartile) to 4 (bottom quartile). *Real Rank (Task)* refers to the real rank in the real effort task and takes values 1 (top quartile) to 4 (bottom quartile). *Real−Self-Assessed Rank (Task)* refers to the difference between the real and the self-assessed rank in the real effort task. *Self-Assessment (Bargaining)* refers to the self-reported rank in bargaining and takes values 1 (top quartile) to 4 (bottom quartile). *Real Rank (Bargaining)* refers to the real rank in bargaining and takes values 1 (top quartile) to 4 (bottom quartile). *Real−Self-Assessed Rank (Bargaining)* refers to the difference between the real and the self-assessed rank in bargaining. *Risk Preferences* takes values 1-8, with lowest numbers indicating greater risk aversion. *SVO angle* is the SVO angle from Murphy et al. (2011). Column (3) displays the *p*-value from a two-tailed *t*-test on the equality of means by gender.

TABLE A2– MEAN VALUES OF AMBIGUITY BY TREATMENT AND PIE

	Dist_Mean				Dist_Mode			
	Pie=5	Pie=10	Pie=15	**Overall**	Pie=5	Pie=10	Pie=15	**Overall**
Symmetric	0.040	0.049	0.060	**0.050**	0.030	0.045	0.052	**0.042**
Empowerment	0.086	0.089	0.110	**0.096**	0.091	0.117	0.119	**0.108**
Empowerment with past agreements	0.079	0.068	0.089	**0.080**	0.072	0.067	0.090	**0.078**
Entitlement	0.090	0.073	0.065	**0.077**	0.091	0.078	0.065	**0.079**
Entitlement with past agreements	0.073	0.057	0.058	**0.062**	0.070	0.050	0.057	**0.058**
Information	0.070	0.114	0.100	**0.097**	0.054	0.150	0.187	**0.137**
Overall	0.073	0.076	0.082	**0.077**	0.068	0.086	0.095	**0.084**

Notes: Mean values for the two ambiguity measures, by treatment and pie: *Dist_Mean* and *Dist_Mode* for successful agreements. *Dist_Mean* is the absolute difference between the responder's share and the mean value of the responder's share by treatment and pie. *Dist_Mode* is the absolute difference between the responder's share and the mode of the responder's share by treatment and pie.

FIGURE A3– HISTOGRAM OF RESPONDER'S PIE SHARE BY TREATMENTS



Notes: Histogram for *Responder's Pie Share* by treatment.

TABLE A3– GENDER DIFFERENCES: AGGREGATE ANALYSIS WITH INDIVIDUAL LEVEL CONTROLS

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: SYMMETRIC						
β_1: Male Prop	0.0389	0.0214	0.0175	0.00401	0.0214	-0.0174
	(0.0638)	(0.0596)	(0.0285)	(0.0680)	(0.0596)	(0.0281)
β_2: Male Resp	-0.0486	-0.0388	-0.00986	-0.0290	-0.0388	0.00977
	(0.0564)	(0.0409)	(0.0311)	(0.0456)	(0.0409)	(0.0308)
β_3': Male#Male	0.0211	-0.0111	0.0322	-0.0430	-0.0111	-0.0319
	(0.0885)	(0.0550)	(0.0559)	(0.0664)	(0.0550)	(0.0551)
Observations	400	400	400	400	400	400
# Clusters	80	80	80	80	80	80
PANEL B: ASYMMETRIC						
β_1: Male Prop	-0.00288	-0.0425	0.0396	-0.117**	-0.0425	-0.0749
	(0.0343)	(0.0273)	(0.0255)	(0.0585)	(0.0273)	(0.0476)
β_2: Male Resp	-0.137***	-0.103***	-0.0337	-0.0402	-0.103***	0.0628
	(0.0434)	(0.0317)	(0.0239)	(0.0489)	(0.0318)	(0.0445)
β_3': Male#Male	0.0401	0.0205	0.0196	-0.0153	0.0205	-0.0358
	(0.0605)	(0.0544)	(0.0270)	(0.0746)	(0.0544)	(0.0505)
Observations	1,072	1,072	1,072	1,072	1,072	1,072
# Clusters	242	242	242	242	242	242
PANEL C: ASYMMETRIC WITH PAST AGREEMENTS						
β_1: Male Prop	-0.00137	-0.0234	0.0220	-0.0763	-0.0234	-0.0529
	(0.0347)	(0.0338)	(0.0177)	(0.0582)	(0.0338)	(0.0409)
β_2: Male Resp	-0.0899**	-0.0520	-0.0379**	0.0353	-0.0520	0.0873**
	(0.0426)	(0.0355)	(0.0152)	(0.0418)	(0.0355)	(0.0353)
β_3': Male#Male	0.0266	-0.00533	0.0319	-0.0779	-0.00533	-0.0726
	(0.0579)	(0.0565)	(0.0224)	(0.0814)	(0.0565)	(0.0515)
Observations	1,015	1,015	1,015	1,015	1,015	1,015
# Clusters	240	240	240	240	240	240

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for each bargaining environment, *Pie Size*, *Period* and *Session* fixed effects. Individual level controls include subjects' risk and social preferences and their self-assessed ability levels in the real effort task and in bargaining ability, separately for *Proposers* and *Responders*. All fixed effects and individual level controls are interacted with each bargaining environments. Standard errors are clustered at subject level using two-way clustering. *** p<0.01, ** p<0.05, * p<0.1

TABLE A4– GENDER DIFFERENCES: AMBIGUITY AS INDEPENDENT VARIABLE

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: AMBIGUITY MEASURED AS THE DISTANCE TO THE MEAN						
Male Prop	-0.0905	-0.0387	-0.0518	0.0562	-0.0387	0.0949
	(0.0804)	(0.0698)	(0.0414)	(0.103)	(0.0698)	(0.0749)
Male Resp	0.0427	0.0805	-0.0378	0.146*	0.0805	0.0654
	(0.0872)	(0.0729)	(0.0347)	(0.0854)	(0.0729)	(0.0622)
Ambiguity	7.606	4.174	3.432	-2.284	4.174	-6.458
	(4.880)	(4.245)	(2.542)	(6.470)	(4.245)	(4.761)
Male Prop#Amb	**1.325**	**0.175**	**1.150***	-1.947	0.175	-2.122*
	(1.066)	**(0.899)**	**(0.594)**	(1.424)	(0.899)	(1.086)
Male Resp#Amb	-2.051*	-1.997**	-0.0534	**-1.846***	**-1.997****	**0.151**
	(1.129)	(0.940)	(0.446)	**(1.088)**	**(0.940)**	**(0.804)**
Observations	2,487	2,487	2,487	2,487	2,487	2,487
# Clusters	562	562	562	562	562	562
PANEL B: AMBIGUITY MEASURED AS THE DISTANCE TO THE MODE						
Male Prop	-0.0237	-0.0418	0.0181	-0.0758	-0.0418	-0.0340
	(0.0537)	(0.0447)	(0.0262)	(0.0623)	(0.0447)	(0.0471)
Male Resp	-0.0426	-0.00878	-0.0338*	0.0530	-0.00878	0.0618*
	(0.0569)	(0.0479)	(0.0204)	(0.0521)	(0.0479)	(0.0367)
Ambiguity	6.772	3.200	3.572	-3.460	3.200	-6.659
	(4.731)	(4.112)	(2.481)	(6.305)	(4.112)	(4.648)
Male Prop#Amb	**0.430**	**0.208**	**0.223**	-0.198	0.208	-0.406
	(0.648)	**(0.516)**	**(0.327)**	(0.728)	(0.516)	(0.588)
Male Resp#Amb	-0.876	-0.782	-0.0948	**-0.603**	**-0.782**	**0.179**
	(0.665)	(0.563)	(0.211)	**(0.561)**	**(0.563)**	**(0.378)**
Observations	2,487	2,487	2,487	2,487	2,487	2,487
# Clusters	562	562	562	562	562	562

Notes: Cragg's truncated hurdle model for the pie share captured by the proposer (columns (1)-(3)) and by the responder (columns(4)-(5)). Semi-elasticities are reported. All regressions control for each bargaining environment, *Pie Size*, *Period* and *Session* fixed effects. All fixed effects and individual level controls are interacted with each bargaining environments. Standard errors are clustered at subject level using two-way clustering. Direct effects displayed in **bold**. *** p<0.01, ** p<0.05, * p<0.1

TABLE A5– EFFECTS OF ULTIMATUMS IN PROPOSER'S AND RESPONDER'S PIE SHARE

	Proposer's Outcomes			Responder's Outcomes		
	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$	$S_j(y)$	$S_j(P=1)$	$S_j(y>0)$
	(1)	(2)	(3)	(4)	(5)	(6)
Ultimatum	-0.531***	-0.495***	-0.0360**	-0.431***	-0.495***	0.0642**
	(0.0485)	(0.0434)	(0.0175)	(0.0509)	(0.0434)	(0.0315)
Offer	0.0324	0.0218	0.0106	0.00254	0.0218	-0.0193
	(0.0513)	(0.0479)	(0.0138)	(0.0516)	(0.0479)	(0.0253)
Ultimatum*Offer	0.150***	0.0343	0.116***	-0.180***	0.0343	-0.215***
	(0.0538)	(0.0491)	(0.0197)	(0.0592)	(0.0491)	(0.0358)
Observations	2,487	2,487	2,487	2,487	2,487	2,487
# Clusters	562	562	562	562	562	562

Notes: *Offer* is a dummy variable that takes the value of 1 if the proposal is coming from the *Proposer* and 0 otherwise. All regressions control for each of the bargaining environments, *Pie Size*, *Period* and *Session* fixed effects. All fixed effects are interacted with each of the bargaining environments. Standard errors are clustered at the subject level using two-way clustering. *** p<0.01, ** p<0.05, * p<0.1

B APPENDIX: INSTRUCTIONS

B.0.1 GENERAL INSTRUCTIONS

THANK YOU FOR PARTICIPATING IN THE EXPERIMENT!

We are going to start the experiment. From now on it is not allowed to talk, to look at what other participants are doing or to walk around. Please, switch off your mobile phone. If you have any question or you need help, raise your hand and one of the researchers will assist you. If you do not follow these instructions YOU WILL BE ASKED TO LEAVE THE EXPERIMENT AND YOU WILL NOT GET ANY PAYMENT. Thank you.

The University of the Basque Country has provided the funds for this experiment. The quantity you can earn depends on your decisions, the decisions of other participants as well as on luck.

Experimental stages and tasks: The experiment consists of 3 stages:

In the first stage, you will see matrices with "0"s and "1"s during 5 minutes. Your task consist in counting the number of "1"s in each matrix. The number of correct answers that you provide will determined your productivity which will be relevant for the next part of the experiment.

In the second stage of the experiment, the computer will randomly match you with another partner and your task will consist of dividing an amount of money through a bargaining. This quantity depends on your productivity and the productivity of the participant you are matched with. You will have 3 minutes for each negotiation. There will be 10 bargaining rounds in which you will be matched with a different participant each time.

In the third stage you will be presented with three short tasks in which you can earn more money.

Earnings:

You have 3 euro for sure. In addition, in the second stage of the experiment, once the experiment had concluded, the computer will choose two bargaining rounds randomly and you will be paid the amount you had earned in each of those. Finally, in the third stage you can earn extra money for each of the three short tasks. Therefore, at the end of the experiment your final earnings will be the sum of the 3 euro you get for participating, plus your earnings in the two bargaining rounds randomly selected, plus your earnings in each of the short tasks from stage 3. Your earnings will be paid in cash privately at the end of the experiment.

We will now start with the experiment. At the beginning of each stage, we will include detailed information about the task, the decisions as well as about earning.

B.0.2 REAL EFFORT TASK

In the stage, you will see matrices with "0"s and "1"s, similar to the ones displayed below, during 5 minutes.

Your task consist in counting the number of "1"s in each matrix. The size of the matrices will vary. Once you introduce an answer for one matrix and press the bottom "OK", the next matrix will appear. All participants will see the same matrices in the same order. There is a maximum of 60 matrices.

Example 1: 8x8 Matrix, Solution = 30

1	1	0	1	0	1	1	0
1	0	1	0	1	0	1	1
0	0	1	0	1	0	1	1
0	0	0	0	0	1	1	0
0	0	0	0	1	0	1	0
1	0	0	0	0	0	1	1
0	0	0	1	1	0	1	0
0	0	1	1	1	1	1	1

Example 2: 6x6 Matrix, Solution = 16

1	0	0	0	1	1
1	0	0	0	1	0
0	0	0	1	0	0
1	0	0	1	0	0
1	1	0	0	1	1
1	1	1	1	0	0

The number of correct answers that you provide will determine your productivity. The higher your productivity the higher will be, on average, the amount of money you will have to divide in the next stage.

B.0.3 BARGAINING STAGE: SYMMETRIC

In this stage you will be matched randomly with another participant and your task consists in dividing an amount of money through a bargaining. This amount can be €5, €10 or €15.

HOW IS COMPUTED THE AMOUNT OF MONEY TO BE DIVIDED?

It will be proceed in the following way:

1. The number of correct answers in the first stage will determine the productivity of each participant in the following way:
    - Bottom third: Those participants with a fewest number of correct answers will have a productivity of €5
    - Intermediate third: Those participants with an intermediate number of correct answers will have a productivity of €10
    - Top third: Those participants with the highest number of correct answers will have a productivity of €15
2. In each round, you will be randomly matched with another participant and the amount to be divided will be:
    - YOUR PRODUCTIVITY with a 50% chance
    - THE PRODUCTIVITY OF THE PARTICIPANT YOU ARE MATCHED WITH with a 50% chance

For example, if your productivity is €5 and the productivity of the other participant is €15, the amount to be divided will be €5 with a 50% chance and €15 with a 50% chance. Finally, if you and the participant with whom you are matched have the same productivity of 5, 10, or 15 euro, then the amount to be divided will be 5, 10 and 15 euro respectively.

WHAT DECISIONS CAN BE TAKEN DURING A BARGAINING?

Before starting, for each couple, you will be told whether you are participant A or participant B. During the negotiation you will have to decide HOW MUCH MONEY WILL GET PARTICIPANT B, such that if you are participant A you will make offers to participant B and if you are the participant B you will make demands from participant A.

The negotiation works in the following way:

- Participant A will start the negotiation with a first offer, deciding how much money wants to offer to participant B.
- Participant B can accept or reject that offer. If the offer is accepted, participant B will get the amount offered and participant A will get the pie to be divided minus the amount offered to participant B.
- If the offer is rejected, the bargaining continues and it will be the turn of participant B for making a demand from participant A, deciding how much money wants to get.
- Participant A can accept or reject that demand. If the demand is accepted, participant B will get the amount demanded and participant A will get the pie to be divided minus the amount demanded by participant B.
- If the demand is rejected, the bargaining continues and it will be the turn of participant A for making a new offer to participant B. And so on and so forth.

Offers and demands have to be multiples of €0.1 (10 cents). You will have a total of 3 minutes to reach a deal. If during this time you do not reach a deal, both participants will get €0.

There will be 10 different bargaining rounds where you will be matched with a different participant each time. During each negotiation you will be informed about the amount of money you have to divide, if you are participant A or participant B, of the remaining time left for the 3 minutes, as well as on the complete bargaining record: offers made by A, demands made by B and whether they have been accepted or rejected.

For payment, at the end of the experiment, the computer will choose two bargaining rounds randomly, one between rounds 1 and 5 and another between rounds 6 and 10, and you will be paid according to the

deal you have reached in those negotiation rounds or €0 in case that you did not reach a deal.

B.0.4 BARGAINING STAGE: EMPOWERMENT

[. . .] If during this time you do not reach a deal,

participant A will get an amount of money for sure, while participant B will get €0. The amount of money that participant A get, is a randomly chosen amount between 50% and 85% of the amount to be divided.

That is, in case in which you don't reach a deal within the 3 minutes, participant A will get:

- Between €2.5 and €4.25 if the amount to be divided is €5
- Between €5 and €8.5 if the amount to be divided is €10
- Between €7.5 and €12.75 if the amount to be divided is €15

The exact amount will be randomly chosen by the computer once the negotiation had finished.

[. . .] At the end of the experiment, the computer will choose two bargaining round randomly, one between rounds 1 and 5 and another between rounds 6 and 10, and you will be paid according to the deal you have reached in those negotiation rounds or

a positive amount if you are participant A and €0 if you are participant B in case that you did not reach a deal.

B.0.5 BARGAINING STAGE: EMPOWERMENT WITH PAST AGREEMENTS

Finally, you will provided with the information on the most frequent agreed amount for the participant B in the previous sessions.

B.0.6 BARGAINING STAGE: ENTITLEMENT

[. . .] as well as on the complete bargaining record: offers made by A, demands made by B and whether they have been accepted or rejected.

In addition, you will know your productivity and the productivity of the participant with whom you are matched, so you could learn whether the amount to divide corresponds to your productivity or to the productivity of the participant with whom you are matched.

B.0.7 BARGAINING STAGE: ENTITLEMENT WITH PAST AGREEMENTS

Finally, you will provided with the information on the most frequent agreed amount for the participant B in the previous sessions.

B.0.8 BARGAINING STAGE: INFORMATION

[. . .] There will be 10 different bargaining rounds where you will be matched with a different participant each.

During each negotiation only the participant A will observe the amount to be divided while the participant B will only know that this amount can be 5, 10 or 15 euro, but not the exact amount. The participant A cannot accept demands that are higher than the amount of money to be divided.

B.0.9 ELICITATION TASKS

This stage of the experiment consists of three short tasks with which you can earn extra money. The first one consists in answering four different questions regarding this session. In the second and in the third you will have to choose among different options.

As you will progress in this third stage of the experiment, we will provide you with more detailed instructions about each task.

TASK I:

Next you will be asked 4 questions relative to this session. At the end of the experiment the computer will choose one of them randomly and you will be paid €1 if the answer you have provided is correct according to the data we have gather during the session and €0 otherwise.

QUESTION 1: If we sort all participants in this session from lowest to highest number of correct answers in stage 1 (counting "1"s), and we divide all subjects in 4 segments of equal size such that the participants with highest scores are in the first segment, the next in the second, the next in the third and the ones with lowest in the fourth segment, in which segment do you think you will be?

Options: 1^{st} segment/2^{nd} segment/3^{rd} segment/4^{th} segment

QUESTION 2: On average, who do you think has performed better in the task from stage 1 (counting "1"s)?

Options: Men/No differences/Women

QUESTION 3: In each negotiation, a participant could get between 0% and 100% of the amount of money to be divided. If we sort all participants in this session from lowest to highest share of money that on average has obtained during the 10 negotiations, and we divide all the subjects in 4 segments of equal size such that the participants who obtained on average the highest share of money are in the first segment, the next in the second, the next in the third and the ones with lowest in the fourth segment, in which segment do you think you will be?

Options: 1^{st} segment/2^{nd} segment/3^{rd} segment/4^{th} segment

QUESTION 4: On average, who do you think has obtained a higher share of money during the negotiations?

Options: Men/No differences/Women

TASK II:

On the next screen you will be presented with 8 different options, each of which offers two different quantities that you can win by choosing that option. In all the options, each outcome has a probability of 50%, i.e., the result of choosing an option depends exclusively on luck. At the end of the experiment the computer will randomly pick one result from the option you have chosen and you will be paid accordingly.

Below this text you will find the 8 available options. To see in more detail how to read this table, consider option 5. In this option the possible results are €0.7 and €2.7. Both are equally likely, which means that the computer will choose €0.7 as the payment on one of every 2 occasions and €2.7 the other.

You must choose one of the 8 possible options. To that end, an empty box will appear where you must enter the number of the option (from 1 to 8) that you want to choose.

	Probability 50%	Probability 50%
1	€1.5	€1.5
2	€1.3	€1.8
3	€1.1	€2.1
4	€0.9	€2.4
5	€0.7	€2.7
6	€0.6	€2.8
7	€0.4	€2.9
8	€0	€3

TASK III:

Next you will be matched randomly with another participant in this room. You will be presented with 6 situations in which you will have to choose one from among 9 options. Each option represents the quantity of money that you can earn from this task as well as the quantity of money that can earn the participant with whom you are matched.

At the end of the task, one participant in the matching will be randomly selected as Decisor and the other as Receptor. The computer will randomly select one of the 6 situations and the payment you will get is the following:

- If you are the Decisor, you will obtain what you have chosen for yourself in the situation selected by the computer
- If you are the Receptor, you will obtain what the other participant have chosen for you in the situation selected by the computer

The quantities displayed represent cents of euro.