An Experiment on Gender Representation in Majoritarian Bargaining*

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Abstract

Women are underrepresented in business, academic, and political decision-making bodies across the world. To investigate the causal effect of gender representation on multilateral negotiations, we experimentally manipulate the composition of triads in a majoritarian, divide-the-dollar game. We document a robust gender gap in earnings, driven largely by the exclusion of women from alliances rather than differential shares within alliances. Experiments with different subject pools show that distinct bargaining dynamics can underlie the same inequitable outcomes: While gender-biased outcomes can be caused by outright discrimination, they can also be driven by more complex dynamics related to differences in bargaining strategies. We identify two fundamental gender differences in bargaining dynamics. First, men are more likely to make opening offers and enjoy a payoff advantage for doing so, yet women that propose first do not and may even suffer backlash. Second, mixed-gender alliances are less stable when the excluded party is male rather than female. These findings show that there is no "one-size-fits-all" solution to the gender gap we uncovered and highlight the importance of studying bargaining dynamics in detail.

JEL Classification: C72, J16, J31

Keywords: multilateral bargaining, gender gap, lab experiment, discrimination, coalitions

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1 Introduction

Evidence from multiple studies and surveys reveals that women are largely underrepresented in decision-making bodies worldwide across business, academic, and political domains.[1] This imbalance has led to widespread calls for policies aiming to close the gender gap of female representation in decision-making bodies (e.g., European Commission Gender Equality Strategy 2020-2025 and United Nations 2030 Sustainable Development Goals). Besides a first-order equity concern for gender parity, it is often argued that women's under-representation in committees, boards, and teams may systematically lead to *less desirable overall outcomes* and affect women in particular negatively. The latter undesirable outcome is arguably more likely if decisions are reached according to the expressed views of a majority, where if women are underrepresented, males might form alliances to advance their interests, further diminishing women's actual influence on decision-making.

However, the precise way in which the gender composition of committees, boards, and teams causally affects the outcomes of negotiations is unknown and warrants careful investigation. This is especially important for understanding decision processes within modern organizations and firms where many decisions are made by teams (Lazear and Shaw, 2007), even at high hierarchical levels (Menz, 2012).[2] For example, top management team members (i.e., senior executives in charge of different functional areas in their organizations), must hold regular meetings to devise business strategies but there is no guarantee that their interests are fully aligned (Edmondson et al., 2003). This may lead to the formation of alliances to secure power and influence in the organization and advance self-interested agendas. In business partnerships, such as legal firms, important managerial and profit-sharing decisions are reached via negotiations with the participation of partners.[3]

Another setting where bargaining certainly takes place within firms is in self-managed teams in which members may engage in internal negotiations to assign responsibilities and tasks to achieve their objectives. Because the interests and incentives of the members within an organization or team are unlikely to fully overlap, and often can be highly divergent, alliances pursuing mutually beneficial outcomes are expected to arise (Mithani and O'Brien, 2021).[4]

But what role does gender, and the gender composition of an organization or team, play in determining which coalitions will form and the end result of negotiations? An important body of work has emerged to investigate gender differences in bargaining, mainly via laboratory experiments.[5]

[1] In the 116th United States Congress (2019-2021), only 23% of members of Congress and 26% of Senators are women. In 2019, 24.9% of all members of parliamentary bodies around the world were women (Inter-parliamentary Union, 2020). Women represent only 22% of chief executives in the United States (Huang et al., 2019).

[2] See Gavetti et al. (2012) for a summary of research on the behavioral theory of the firm, specifically relating to the political processes within firms.

[3] See Wesemann and Kerr (2020) for a survey on law firm compensation schemes, in which *subjective* schemes entailing negotiations are quite common in the U.S.

[4] According to Mithani and O'Brien (2021), "[a] coalition, therefore, is a compromise between individuals with overlapping but nonidentical interests undertaken to improve potential gains against others with relatively divergent interests".

[5] Gender differences in bargaining have also been studied in the field (Castillo et al., 2013; Leibbrandt and List, 2015; Andersen et al., 2018; Hernandez-Arenaz and Iriberri, 2018; Säve-Söderbergh, 2019). See also Recalde and Vesterlund

Studies that exogenously vary gender pairing in bargaining have focused exclusively on bilateral bargaining settings (Eckel and Grossman, 2001; Solnick, 2001; Sutter et al., 2009; Eriksson and Sandberg, 2012; Hernandez-Arenaz and Iriberri, 2020; Exley et al., 2020).[6] Taken together, the results from the previous studies indicate that women are more generous than men (Eckel et al., 2008; Engel, 2011; Bilén et al., 2021) and women are more likely to accept lower offers than men in the ultimatum game. While bilateral settings are a natural starting point for investigating bargaining behavior, they do not capture essential elements inherent to more general bargaining settings like the ones discussed previously. In particular, if women are more willing than men to accept lower shares, they become more attractive to others (men and women alike) as partners in an alliance and, consequently, one would expect men to be left out of agreements more often. As such, it is unclear whether the lower payoffs that women earn in bilateral settings are a harbinger of a gender gap in a multilateral, majoritarian setting like the one we study.

In this paper, we conduct a multilateral bargaining experiment where individual interests are clear and divergent as induced by the experimental incentives. Monetary payoffs stand in for all interests of parties (e.g., being assigned preferred tasks in a self-managed team) trading off external validity for better control over preferences. Participants in our main experimental treatment were randomly placed in triads composed of one female and two male subjects (hereafter labeled MMF). We also conducted three other treatments varying the gender composition: all female (FFF), female majority (FFM), and all male (MMM). The treatment MMF will be our main treatment of interest as it emanates from our motivation and research question, while the other treatments will help us answer ancillary questions.

The subjects' task was to divide a sum of money through a free-form, majoritarian bargaining protocol taking place via computer terminals. Gender revealing silhouettes representing each subject were displayed during the bargaining.[7] In the game played by subjects, an agreement is temporarily reached when at least two members of the triad support a division of the money. For the agreement to be *ratified* and binding, it must be continuously supported for a pre-determined ratification time period. During the ratification period, a member who is not a party to the pre-agreement may engage in making offers in order to lure partners into a new alliance, thus impeding the agreement from becoming binding. Also, parties to the preliminary agreement are free to reconsider and propose alternatives.[8]

Our experimental setting is different from previous studies of gender differences in bargain-

(2020) who thoroughly review the field experiments focusing on wage bargaining and prices.

[6] Laroze et al. (2020) study gender, along with race and political orientation, in an experimental three-player Baron-Ferejon game (Baron and Ferejohn, 1989), but do not exogenously manipulate gender, making it difficult to isolate its role.

[7] Each displayed silhouette was based on the participant's revealed gender when they registered in our recruiting system. In all cases, the subject's self-reported gender in a questionnaire matched their registered gender.

[8] Importantly, our experiment builds on previous studies of unstructured bargaining games such as Bolton et al. (2003); Bolton and Brosig-Koch (2012); Camerer et al. (2019); Tremewan and Vanberg (2020), and Siegenthaler and Kamm (forthcoming). For a meta-analysis on structured multilateral bargaining experiments see Baranski and Morton (2022).

ing games in the following ways. First, by studying a multilateral setting, we naturally allow for agreements to include the smallest feasible alliance (i.e., a distribution of benefits including only a simple majority of supporting members) or the all-inclusive alliance (i.e., a distribution of benefits including every member of the group). Borrowing terminology from the theoretical and experimental literature on multilateral bargaining (Eraslan and Evdokimov, 2019), we refer in the analysis section to these types of agreements as minimum winning coalitions (MWCs) and grand coalitions (GCs), respectively. Second, the largely unstructured nature of our bargaining protocol allows us to address novel questions such as whether there are gender differences in the propensity to make the first offer, spontaneously leave temporary coalitions, or choose to make aggressive counteroffers. Our unstructured protocol is arguably more appropriate for the study of corporate boards, teams, and other organizational settings where the formation and dissolution of alliances is central to the back-and-forth negotiation process often described. Even in bodies with formal procedures in place (i.e., binding rules for proposal making and voting) such as legislatures of judicial panels, informal negotiations typically precede the formal procedures.

In our first set of experimental sessions—conducted at Maastricht University—we uncover a gender gap in earnings: Men earn 21% more than women in MMF. Most bargaining agreements are two-way splits of the money, with women being excluded 42% of the time (i.e., receiving a share of zero). When mixed-gender alliances form, there are minimal differences in payoffs between the male and female coalition partners, meaning that the gender gap is mainly driven by female's overwhelming exclusion from alliances and not by gender differences in earnings within them. In the treatment with female majority (FFM) we also find the males earn more than females (2.1%), but the gap is not statistically significant at conventional levels. Finally, we find that increasing female representation leads to more inclusive sharing of the money as grand coalitions are most likely to be observed in FFF and least likely in MMM. Hence, our experiment provides a causal link between female representation and outcome fairness.

In order to probe the robustness of our main finding, we conducted additional experimental sessions focusing on mixed gender treatments with participants from the University of Valencia in Spain.[9] We are able to replicate the gender gap in MMF, yet we find a wider gap in FFM with males earning approximately 20% more than females. Having probed the robustness of the gender gap, we conduct an investigation into its causes and the underlying mechanisms by analyzing bargaining dynamics in detail.

There are two channels, which are common to both samples in our study, that help explain the gender gap in earnings. The first behavioral regularity we identify is that men are more active negotiators. We find that they are more prone to making opening offers than women. This behavior

[9]Note that the aim of this paper is not to study cultural differences. The only reason we conducted additional experimental sessions in Spain was that the BEELab in Maastricht was closed due to COVID-19. Nevertheless, we acknowledge and discuss the possible role of culture in our results in Section 4. This unplanned switch turned out to be serendipitous as it allowed us to not only show the robustness of some findings to different subject pools but also identify new mechanisms not present in the first subject pool.

makes men more likely to be part of an alliance, which gives rise to a payoff advantage. Intriguingly, men benefit from proposing first whereas women do not. Hence, even if females attempted to mimic the active negotiation patterns characterizing male behavior, there is no reason to expect that this will aid in closing the gender gap in earnings. A second behavioral regularity contributing to the gender gap in earnings is that mixed-gender coalitions are less stable than male-male coalitions in MMF. Thus, the instability of initial mixed-gender coalitions in MMF contributes to the over-exclusion (relative to pure chance) of females from final agreements, and thus, not receiving any money from the fund to divide.

In light of these two behavioral regularities, it is natural to ask whether majorities discriminate against minorities, and if such behavior could explain the gender gap in earnings. In our first experiment (conducted in Maastricht), only 58% of coalitions are mixed gender in MMF while a random partner choice would result in 67% being mixed gender. While this may appear first hand as the result of direct discrimination, a detailed look into the bargaining process reveals this is not the case. When males make the opening offer, they invite the only female in the triad more often (56% of the time). When a man is excluded from a MWC, only 31% of a man's outside offers are made to a male (vs. 45% to a female). Another behavioral pattern we find is that left-out males are quite aggressive and insistent in their attempts to break the mixed-gender MWCs, and included males are less *loyal* to their initial female partner as we find that they are more likely to break the interim agreement. Put together, these findings are not in line with a taste-based explanation for the gender gap in earnings in which men directly or intentionally discriminate against women.

However, the bargaining dynamics observed in the second experiment (Valencia) differ in some important aspects. First, we find that men display a preference for partnering with each other in male-majority treatments. Second, we do not find that women are less aggressive than men in attempting to break coalitions.

Collectively, the results from our experiments highlight that the existence of a gender gap in majoritarian negotiations may arise through several channels. While some of these channels are shared in the two samples of our study, others are not, which hints at possible cultural differences as a potential explanation (we discuss this aspect in Section 4.4). We conduct some counterfactual analysis which estimates the magnitude of each channel in creating a gender gap and shows that there is no "one-size-fits-all" policy solution (see section 4.1). Instead, our analysis underscores the relevance of studying in detail the endogenous bargaining dynamics that arise in a negotiation. Policymakers and those seeking to create better organizations that can foster equitable outcomes must first analyze in detail the context and forces that can sustain male-female differences.

Our study contributes to the vast experimental economics literature on gender differences, which has found that men are more inclined to enter competitions (Niederle and Vesterlund, 2007), contribute ideas (Coffman, 2014), lead a team (Born et al., 2020), and give advice on how to play strategically (Cooper and Kagel, 2016). Importantly, by now, there are robust findings showing that women's

decision-making is influenced by gender stereotypes, as well as by gender composition, when the domain is stereotypically perceived as disadvantageous for women (Coffman, 2014; Bordalo et al., 2019; Geraldes, 2020; Shan, 2020; Stoddard et al., 2020). Thus, understanding the role of gender in multilateral bargaining outcomes and dynamics will expand our understanding of men's and women's behavioral patterns in an important novel direction.

This article proceeds as follows. In Section 2, we present the design of the experiment and present our main results in Section 3. We discuss our results, as well as similarities and differences between subject pools, in Section 4. Finally, Section 5 concludes the article.

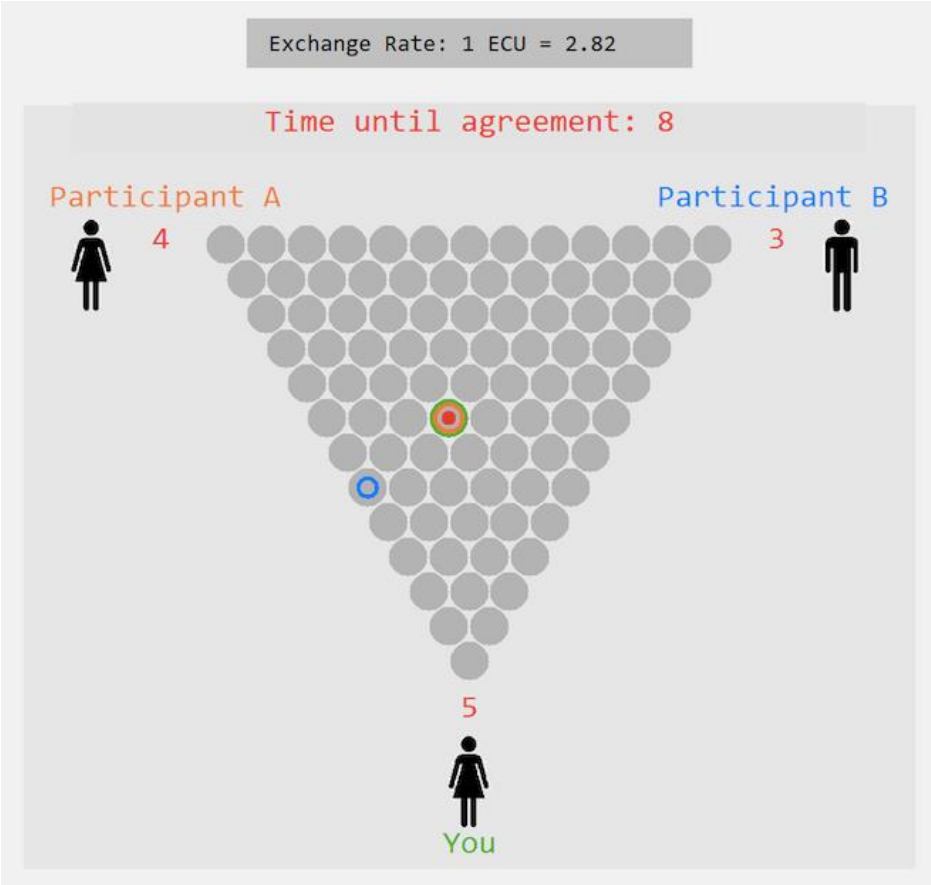
2 Experimental Design

2.1 The Bargaining Game

Participants were randomly grouped in triads to divide 12 points, which corresponded to 36 euros at the beginning of the negotiations. A silhouette indicating the gender of each member of the committee was displayed. At any moment during the bargaining process, participants could: (1) make a proposal on how to divide the twelve points, (2) provisionally support (or not) an existing proposal, or (3) withdraw the proposal after having made one. Bargaining ended and a split of the points was implemented when at least two members of the triad agreed on a split for a ten-second *ratification period*. This design closely follows the unstructured bargaining protocol of Tremewan and Vanberg (2020) and the layout of the bargaining interface is displayed in Figure 1.

Importantly, each second that elapsed during the game, the value of the fund decreased by 24 cents. The total fund continues to fall each second during the ratification period. Thus, if 150 seconds went by without agreement, all players earned 0. The experiment was computerized using the zTree software (Fischbacher, 2007). Screenshots, experimental instructions, and details of the bargaining interface can be found in the Online Appendix. All interactions are anonymous and there is no communication allowed between participants. In each treatment, the bargaining game was repeated 12 times. In what follows, we denominate each repetition of the bargaining game as a *period*.

Figure 1: Bargaining Interface



Notes: This figure shows the screen that subjects saw in the experiment. On each vertex of the triangle, a silhouette is shown revealing the gender of the subject in question. Offers are made by clicking on the triangle in a given circle. Each circle represents a different possible division of the pie. By clicking outside the triangle a subject withdraws her current offer. When two subjects click on the same circle (i.e., make the same offer) a red dot appears in the circle and a timer indicating the "time until agreement" is displayed so that subjects are aware that a preliminary agreement is in place. On the top part of the screen, subjects can see how the exchange rate between experimental currency units (ECUs) and Euros decays as each second elapses. For further details, see the Online Appendix.

2.2 Treatments and Session Details

We conducted four treatments (between-subjects): *Male majority* (MMF), *Female majority* (FFM), *All female* (FFF), and *All male* (MMM). This means that the gender composition of the triads was fixed in each treatment even though the triads were randomly re-matched in each of the 12 periods. The number of repetitions was selected with two reasons in mind. First, we wanted to allow for ample learning opportunities and second, we wanted the experiment to remain within a reasonable time limit. Only one period was randomly selected for payment.

We recruited an equal number of men and women to participate in each session, so that upon

arriving to the laboratory, participants would see a gender balanced group.[10] During each session, we conducted two treatments concurrently but subjects only participated in one of them. Thus, there are two matching groups in each session from which participants are rematched each period. Six sessions were for the treatments MMF and FFM, and the other six sessions were for the treatments FFF and MMM. In the sessions involving the two mixed-gender treatments, 1/3 of the men were matched with 2/3 of the women to run the FFM treatment and the remaining participants assigned to treatment MMF. This particular recruiting and treatment allocation procedure was done in order to avoid revealing the objective of the experiment ex-ante.[11]

Prior to the start of each session, a demographic survey was conducted which asked for gender among several other questions. Importantly, participants saw the same silhouettes they would see at the bargaining stage when selecting their gender. Thus, it was common knowledge during the bargaining game that silhouettes represented their gender and the gender of their opponents. In our sample, it was always the case that the reported gender matched what the experimenters determined when assigning participants to computer terminals. Importantly, gender was never mentioned in the instructions or invitation email. We discuss the implications of our design concerning potential experimenter demand effects in Section 4.

A total of 282 subjects participated in our first experiment. They were undergraduate students from Maastricht University in the Netherlands. A show-up fee of 5 euros was offered and earnings averaged 16.50 euros. Sessions lasted about 60 minutes.

In order to test the robustness of the gender gap in earnings, as well as to gather more data for the exploratory analysis of mixed-gender coalition dynamics (section 3.3), we conducted eight additional sessions of the mixed-gender treatments (MMF and FFM). The second experiment was conducted at the Laboratory for Research in Behavioural Experimental Economics (LINEEX), located in the University of Valencia, Spain. A total of 192 subjects took part in these experiments and all the procedures were identical to those of the sessions conducted in Maastricht.

In Table 1, we summarize the structure of the data. In Maastricht, we observed 288 bargaining games in the FFF and MMM treatments, and 276 bargaining games in the FFM and MMF treatments. In Valencia, we observed 384 bargaining games in the FFM and MMF treatments.

[10] The order of treatments was randomized, so that participants are effectively randomly assigned. The participants' characteristics support that our procedure to randomly assign participants across treatments has been successful (see Section C of the Online Appendix for details).

[11] One cannot rule out that subjects in FFF and MMM would find it unusual that the gender composition of triads remains fixed during the experiment because they had observed a gender-balanced composition in the welcome room. Nevertheless, considering the benefits and drawbacks of having only one gender per experimental session (and thus likely revealing the experiment's aim to subjects in the FFF and MMM treatments) or implementing mixed-gender sessions to conduct FFF and MMM simultaneously, we decided on the latter design choice. Importantly, answers in the debriefing questionnaire do not reveal any concern related to this issue, nor did any subject ask about this aspect at the end of the FFF or MMM sessions.

Table 1: Description of Data Set

Treatment	Subjects	Periods	Agreements[1]	Matching groups[2]
Maastricht				
FFF	72	12	288	6
FFM	69	12	276	6
MMF	69	12	276	6
MMM	72	12	288	6
Valencia				
FFM	96	12	384	8
MMF	96	12	384	8

[1] An agreement refers to a bargaining outcome (there are no disagreements in our sample). It is the number of periods times the number of subjects divided by 3.

[2] In one of our mixed-gender sessions (Maastricht), not enough subjects showed up. Hence, the two matching groups in that session had 9 subjects each.

3 Results

In this section, we report the results of our experiments, with the focus being on MMF. We begin by testing whether there are disparities in earnings by gender. Subsequently, we aim to explain the differences, first by looking at the types of final divisions that arise, then with a more detailed look at gender differences in bargaining strategies and their impact on final agreements. At each step, we compare and contrast the results from our two different subject pools. We note here that all groups eventually reached an agreement, and therefore we observe a monetary division for every game played.

3.1 Are There Gender Differences in Earnings?

Average earnings by gender are displayed in Table 2. Focusing first on our main treatment of interest, we find a significant gender gap in MMF in both samples. Males earn 22% more than females (11.34 EUR vs. 9.32 EUR, $p < 0.094$) in Maastricht and 15% (11.02 EUR vs 9.61 EUR, $p = 0.078$) in Valencia.

We also find evidence of a gender gap in FFM varying from 2% in FFM (10.90 EUR vs 10.66 EUR, $p = 0.844$) in Maastricht and 21% in FFM (11.95 EUR vs 9.88 EUR, $p = 0.016$) in Valencia. Pooling data across location and mixed-gender treatments, men earn approximately 12% more than women (11.21 EUR vs. 10.02 EUR, $p < 0.01$, Wilcoxon signed rank test using gender differences of matching group averages).[12]

We summarize in our first result:

[12] The small difference in earnings between the homogenous treatments is driven by the fact that all-male groups come to an agreement marginally faster than all-female groups (15.31 seconds in MMM vs. 16.85 seconds in FFF). See Section D3 in the Online Appendix for an analysis of time to agreement.

Table 2: Average Earnings (in Euros)

	FFF	FFM	MMF	MMM
Combined data				
Females		10.21	9.49	
Males		11.51	11.15	
p-value		0.042^{**}	$< 0.01^{***}$	
Maastricht				
Females	10.65	10.66	9.32	
Males		10.90	11.35	10.78
p-value		0.844	0.094^{*}	
Valencia				
Females		9.88	9.61	
Males		11.95	11.02	
p-value		0.016^{**}	0.078^{*}	

The p-values are based on Wilcoxon signed rank tests comparing within-matching group gender differences in averages. $n = 14$ for combined data; $n = 6$ in Maastricht; $n = 8$ in Valencia. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Result 1. *On average male subjects earn more than females in majoritarian bargaining.*

3.2 Gender Differences in Bargaining Outcomes

In this subsection, we focus on the overall split of the money. How many members receive a share of the money and how many receive nothing? Are MWCs the most common types of agreements as in related multilateral bargaining games? We then investigate the degree to which the observed gender gap in earnings in MMF can be explained by the prevalence of MWCs, the rate at which females are excluded from them, and/or the distribution of earnings within coalitions.

3.2.1 Final Agreements: Types of Coalitions

We start by analyzing the type of allocations that triads agreed upon. In Table 3, we report the proportion of MWCs for each treatment[13], which are all in line with the literature (Palfrey, 2016; Baranski and Morton, 2022). Clearly, MWCs are modal, representing approximately 80% of all agreements. In Figure 2, we see that the proportion of MWCs is increasing with experience in all treatments.

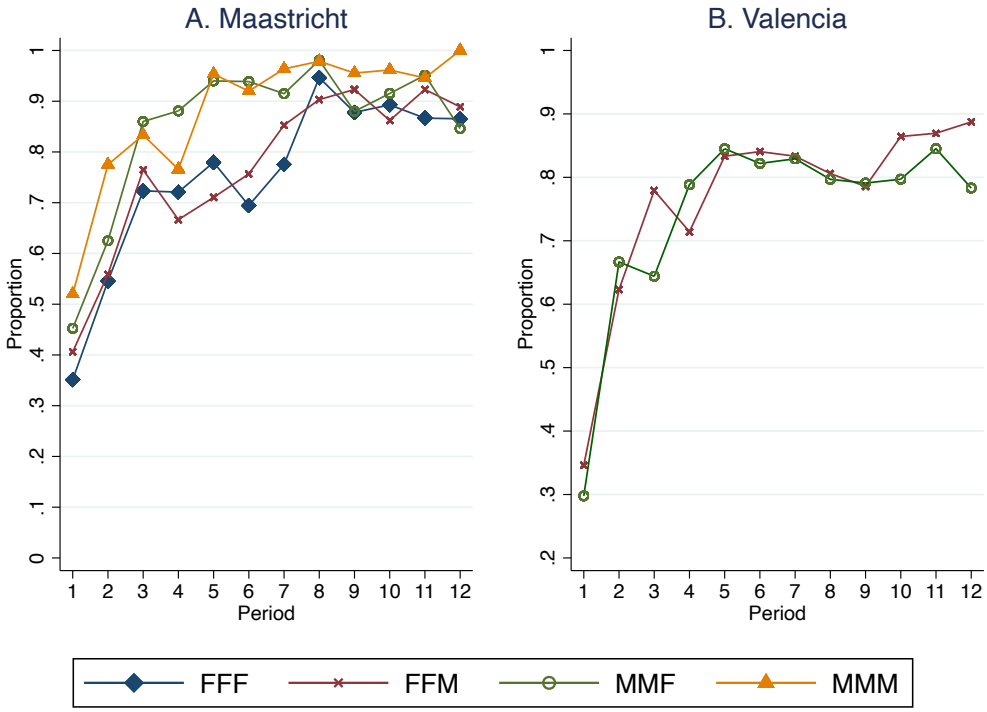
Table 3 shows a clear pattern in Maastricht: As the number of males increases in the triad, so does the proportion of MWCs. To probe the statistical significance of these observations, we conduct a probit regression of the probability of a MWC on the number of females in the group (clustering at the matching group level), using only the data from Maastricht where we have all four treat-

[13]The proportion of GCs are almost exactly the inverse of MWCs, so we do not report these separately. The difference is the small number of games where one-player took everything.

Table 3: Proportion of Minimum Winning Coalitions by Treatment

	FFF	FFM	MMF	MMM
Maastricht				
All MWCs	0.74	0.74	0.84	0.87
Equal splits (50% each)	0.53	0.55	0.59	0.64
Valencia				
All MWCs		0.79	0.74	
Equal splits		0.57	0.48	

Figure 2: Minimum Winning over Periods of Play, by Sample



ments. The marginal effects are reported in Table A1. Our regression shows that each additional female in a triad represents a 5 percentage point decrease in the probability of observing a MWC ($p < 0.01$). Regressing instead on treatment dummies, of the six bilateral comparisons we find significant differences only between FFF and MMM ($p < 0.01$) and between FFM and MMM ($p = 0.039$). These results are robust to controlling for a period trend. An unreported probit regression finds that the difference in proportions of MWCs between the two treatments in Valencia is not statistically significant ($p = 0.312$).

3.2.2 Gender Composition of MWCs

Table 4 reports the proportion of mixed-gender coalitions in FFM and MMF. In Maastricht, we find that 67% of the time MWCs are mixed-gender in FFM—which is consistent with equiprobable partner choice—but only 58% in MMF (see top of Table 4). This implies that outcomes are worse for women than for men when they are in the minority, but are not better when in the majority. There is only marginal statistical evidence that mixed-gender coalitions in MMF occur significantly less than by chance ($p = 0.099$[14]).

Table 4: Bargaining Outcomes in Mixed-Gender Treatments

	FFM	MMF
Mixed-gender MWCs		
Maastricht	0.67	0.58*
Valencia	0.77**	0.59**
Mean Share of Females in Mixed-gender MWCs		
Maastricht	49.0	50.4
Valencia	49.5	50.9*
Mean Share of Females in GCs		
Maastricht	33.6	29.0
Valencia	33.5	31.7

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Null hypotheses for t-tests: mixed-gender MWCs = 2/3; Female share in MWCs = 0.5; Female share in GCs = 1/3. Standard errors clustered at the matching group level.

In Valencia, men are more likely to be part of a MWC in both mixed-gender treatments. Mixed-gender coalitions occur 59% of the time in MMF, which is less than predicted by a random coalition formation process ($p = 0.036$). In FFM, these represent 77% which is higher than predicted by chance ($p = 0.018$).

Result 2. *Females are generally more likely to be excluded from MWCs than predicted by chance.*

3.2.3 Gender Differences in the Division of Surplus within Coalitions

We now investigate whether there are gender differences in the split of the surplus within mixed-gender coalitions (see Table 4). Women take 49% of the pie in FFM and 50.4% in MMF in Maastricht, and 49.5% and 50.9% respectively in Valencia. These figures differ statistically from 50% only in MMF in Valencia ($p = 0.067$), but the magnitude of this difference is small, and in the opposing direction to explain lower female earnings overall. Regarding GCs, in no case does the average share of a female differ statistically from the equitable one-third.

Result 3. *We find no evidence that females receive a lower share than males in mixed-gender MWCs.*

[14] In this section and the following, p-values are obtained from linear regressions on a constant, with standard errors clustered at the matching group level.

3.3 Dynamics in Mixed-gender Treatments

The preceding analysis demonstrates that the main reason females earn less is due to being excluded from MWCs, rather than receiving a smaller share of agreements they are part of. Why are females generally more likely to be excluded from a MWC?

In this section, we conduct an exploratory analysis to better understand the gender differences in the formation of coalitions. We focus on four initial events of the bargaining games, all of which could potentially explain the lower earnings of women.

The first three events we look at are who makes the first offer, who the first offer is made to, and the probability an initial agreement is implemented. These events could explain differences in earnings in the following ways. First, if males are more likely to make the first proposal, and this proposal is more likely to result in an initial agreement, then as initial agreements are implemented in the majority of the games, males will clearly be present in more implemented MWCs. Second, a preference for males to make offers to other males will also reduce the probability a female is in the final coalition. Third, if mixed-gender coalitions in MMF are less likely to be implemented, all-male coalitions will be more prominent.

The probability an initial agreement is implemented can be influenced by two important factors: the type of counteroffers that are made by the excluded player during the first provisional agreement, and the probability that such a counteroffer is accepted (and thus dissolves the initial agreement). To assess the first factor, we examine the first counter-offer made after the initial temporary agreement is formed. In our unstructured game, it is not clear whether a particular offer has been "accepted" because any number of counteroffers by any of the three players can intervene before a new temporary agreement is formed. Therefore, we leave the analysis of acceptance rates for Section 4, where we propose a simple model of behavior that allows to back out the implied willingness to accept counter-offers.

We focus our analysis on these events of the bargaining process because they are straightforward to observe and quantify, and the number of comparable observations available as the game goes on decreases rapidly (most games end after the first agreement and, as time elapses, the ever-decreasing number of games is divided among an exponentially increasing number of possible histories). Also, in around 80% of the games of MMF and FFM, it is the first or second provisional agreement that is implemented. We also limit our attention to MWCs, which are more straightforward to analyze because they are the vast majority of agreements and in a GC proposal or counteroffer, it is not clear who a proposal has been made to.

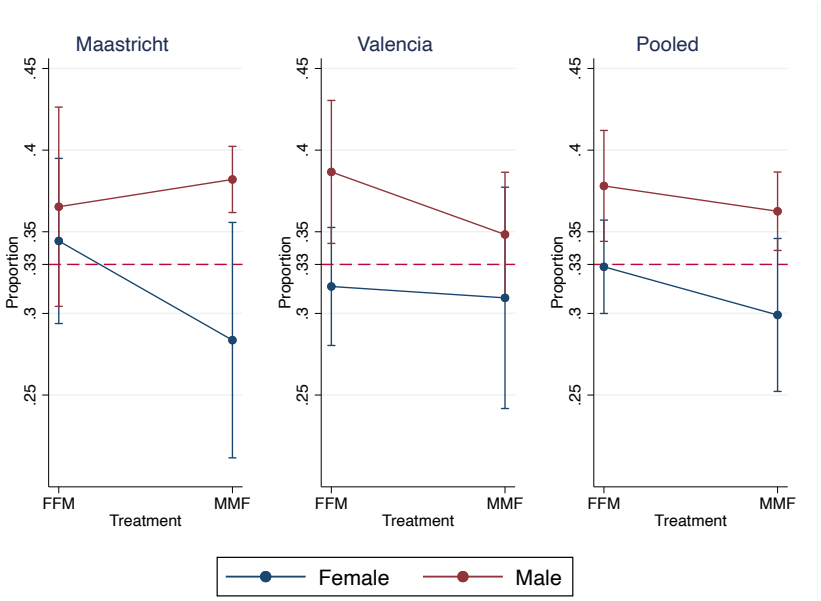
Who Proposes First?

We now test if males are more likely to make opening offers than females. Note that in mixed-gender treatments, the majority gender should make the opening offer 2/3 of the time if each gender had equal likelihood of proposing first.

As shown in Table 5, we see that men are indeed more likely than women to make the opening offer. In Maastricht, when women are the majority, one of them moves first 49% of the time, substantially less than 2/3 ($p = 0.080$). When men are the majority, they move first 79% of the time, substantially greater than 2/3 ($p = 0.023$). The results in Valencia are similar: in FFM, women propose first 45% of the time, and in MMF, men propose first 80% of the time, in both cases significantly different from 2/3 ($p < 0.01$ and $p = 0.018$, respectively).[15]

A further analysis reveals that proposing first is beneficial for males but not for females. Figure 3 shows the mean share that a subject who makes the opening offer earns in the final agreement. Pooling over both samples in MMF, males that make the opening offer end up with over 36% of the money while females only with 29%, a statistically significant difference ($p = 0.037$). A similar pattern arises in FFM (38% vs 33%). Importantly, these result also hold when controlling for the share of money that the first proposer is demanding for him or herself (see Table A2 for regression results).

Figure 3: Share of the Fund for First Proposers in Approved Allocations



Notes: The y-axis measures the proportion of the fund that subject making the opening offer receives in the agreed allocation. 95% confidence intervals, clustering s.e. at the matching group level.

Result 4. *Males are more likely than females to make the first offer regardless of their group's gender composition. Making the opening offer confers an advantage to males but not to females.*

[15] Recall that we have restricted our analysis to MWCs. If we consider all initial proposals, we observe the same qualitative gender bias, although it is less extreme in the FFM treatments.

Is There a Gender Bias in Initial Proposals?

Here we test for a gender bias in the target of initial proposals. As can be seen in the second line of Table 5, in neither sample do women in FFM appear to target their offers at a particular gender. The proportion of initial proposals made by females to females does not differ statistically from 50% (49% in Maastricht and 47% in Valencia). When males are the majority in Maastricht, a male first-mover proposes a MWC to the other male in 44% of cases, so any bias is *in favor* of women ($p = 0.052$). On the other hand, in Valencia, male majority first movers make offers to the other male 57% of the time, which is significantly higher than predicted by a coin toss ($p = 0.004$).

Result 5. *Males are biased towards making first proposals to females in Maastricht, but display a preference for partnering with other males in Valencia. We find no statistical evidence that females show a gender bias in choosing their coalition partner.*

Table 5: Main Results of Analysis of Dynamics

	FFM		MMF	
	Maastricht	Valencia	Maastricht	Valencia
First offers:				
First MWC offers by majority[1]	0.49*	0.45***	0.79**	0.80**
First offer to same gender[2]	0.49	0.47	0.44*	0.57***
Counteroffers:				
(a) Male makes MWC counteroffer (a)	0.56	0.45	0.58	0.48
(b) Female makes MWC counteroffer (b)	0.43	0.45	0.49	0.49
Gender Difference (a) - (b)	0.13	0	0.09	-0.01

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
[1] Test based on a linear regression with standard errors clustered at matching group level. Comparison with 2/3.
[2] Test based on a linear regression with standard errors clustered at matching group level. Comparison with 1/2.

Stability of Initial Agreement

One pattern found in both subject pools is that mixed-gender coalitions are more stable in FFM than in MMF, implemented 9 p.p. more often in Maastricht ($p = 0.226$) and 14 p.p. more often in Valencia ($p = 0.048$).[16] This suggests that excluded males may be better at breaking coalitions than excluded females, for example by being more likely to make a competing offer. Further supporting this notion is the fact that all-male coalitions are consistently more stable than mixed-gender coalitions in MMF, with implementation rates differing by 12 p.p. ($p = 0.141$) in Maastricht and 18 p.p. in Valencia

[16] The probability with which initial agreements are implemented, according to gender composition, treatment, and location, can be seen in Table A3.

($p < 0.01$). The comparison between stability of mixed-gender and all-female coalitions in FFM in Valencia is also consistent with this reasoning, with the former 20 p.p. more likely to be implemented than the latter ($p = 0.086$). However, in the same treatment in Maastricht, all-female coalitions 6 p.p. more stable than mixed-gender coalitions ($p = 0.357$). This does not rule out excluded males being more likely to make attractive offers here, in the case that females in this treatment are particularly averse to accepting outside offers.

Result 6. *Male-male coalitions are more stable than mixed-gender coalitions in MMF. Mixed-gender coalitions are more stable than female-female coalitions in FFM. As such, there is a general tendency for initial coalitions to be more stable when the excluded player is a woman.*

Propensity to Make Attractive Counteroffers

We consider an "attractive counteroffer" to be an offer of a MWC by the excluded player, as we found that GCs are much less likely to be implemented (see Section 3.2.1).[17] In both FFM and MMF in Maastricht, females are less likely to make such an offer, with differences of 13 p.p. and 9 p.p. respectively, although the differences are not statistically significant. This difference is driven by the fact that excluded females are more likely not to counter-offer at all (11% vs. 5%) and more likely to propose GCs (21% vs. 14%). By contrast, male and female behaviour in Valencia is almost identical in these respects.

With regard to bias in the target of counteroffers, of the first counter proposals following an initial mixed-gender provisional MWC in MMF in Maastricht, 45% of those made by excluded men are MWC proposals to women, compared to 31% to the other men. In Valencia, the figures are 37% and 25% respectively. Thus, we can rule out gender discrimination in counteroffers as an explanation for women being left out of final agreements.

Result 7. *Males are more likely to make attractive counteroffers in order to break initial coalitions in Maastricht, but not in Valencia.*

4 Discussion

In this section, we first seek to shed light on the role of the different mechanisms in explaining the gender gap in the male majority treatment. We do so by providing a *back-of-the-envelope* calculations based on a simplified model of behavior as we seek to further our understanding of the instability of mixed-gender coalitions. In particular, we provide an estimate of the willingness to accept external counter-offers.

Next, we discuss three issues that may affect the interpretation of our results. First, we investigate whether participants noticed the gender composition indicated by silhouettes. Second, we

[17] In Table A4, we break down the types of offers immediately following initial MWCs.

analyze the effect of personal characteristics (risk, altruism, etc.) on the share of the surplus that participants earn. Finally, we discuss how cultural aspects may explain differences in behavior between our samples.

4.1 The Role of Different Mechanisms in Explaining the Gender Gap in the Male Majority Treatment[18]

In order to identify the precise role of each channel in the emergence and magnitude of the gender gap, we developed a simplified model of behavior. The model should have the following desirable features: it needs to be sufficiently complex to evaluate the main channels discussed in Section 3.3, but should be as simple as possible to allow straightforward analysis and avoid over-fitting. In addition, it should roughly describe a majority of games. With this in mind, we chose a model which allows for an initial offer and a counteroffer (the first or second temporary agreement was implemented in 75% of games). The model includes as variables the propensity of males to make the first proposal (denoted by p_m in Table 6), the explicit bias by males (b), gender differences in the tendencies to challenge existing coalitions (c_m for males' and c_f for females' willingness to make counteroffers when excluded), and leave existing coalitions (a_m and a_f).[19]

The first four parameters (p_m, b, c_m, c_f) are be taken directly from the data, as shown in Table 5. The parameter p_m is the proportion of first offers made by males; b is the proportion of first offers made by males in which that proposal is a MWC including the other male; c_m and c_f are the proportion of games in which the excluded male and female, respectively, proposes a MWC to one of the initial coalition members.

Obtaining the acceptance rates of counteroffers (a_m and a_f) from the data is more challenging because in the unstructured game, it is not clear whether an offer is explicitly rejected. This is because one or more counter-offers can intervene, from and to any of the three players, before the next temporary agreement forms. Our model allows us to back out the likelihood of males and females accepting counteroffers. We do so by solving a pair of equations for these two unknowns, and our results support the observation that men are more prone to abandon coalitions. Specifically, the solution to our model yields $a_m^M = 0.57$ and $a_f^M = 0.02$ for Maastricht, and $a_m^V = 0.68$ and $a_f^V = 0.25$ for Valencia.[20] These estimates are consistent with our previous analysis and observation that females display a stronger commitment to their initial coalition partner.

In Table 6, we eliminate each bias one at a time and consider how interchanging male and female patterns of behavior impact the gender difference in earnings. Note that for consistency with the model, the baseline earnings difference is calculated based on the proportion of mixed-gender

[18] We are grateful for the remarks of an anonymous referee that encouraged us to look deeper into the causes of the gender gap.

[19] We present the details of our model in the Appendix B for the interested reader.

[20] The female acceptance rate may seem unreasonably low in Maastricht, but recall the stylized nature of our model. This estimate will also capture from the data reluctance to spontaneously leave initial coalitions, and so on.

coalitions in the data, assuming only 50-50 splits.

Table 6: Ratio of Female to Male Earnings under Alternative Behavior

	Maastricht	**Valencia**
Baseline (observed) female to male earnings ratio:	0.81	0.84
A. Ratio if biases are eliminated:		
Random first proposer ($p_m = 2/3$)	0.84	0.88
No male bias in partner selection ($b = 0.5$)	0.79	0.87
B. Ratio if females behave like males:		
When making counter-offers ($c_f = c_m$)	0.86	0.83
When accepting outside offers ($a_f = a_m$)	0.94	0.92
Both ($c_f = c_m$, $a_f = a_m$)	0.99	0.90
C. Ratio if males behave like females:		
When making counter-offers ($c_m = c_f$)	0.88	0.83
When accepting outside offers ($a_m = a_f$)	0.98	0.83
Both ($c_m = c_f$, $a_m = a_f$)	0.98	0.83

See the main text for the meaning of each variable. The notation $a_f = a_m$ means the female acceptance rate is set to the male rate observed in the data, i.e., what happens if females act like males, whereas $a_m = a_f$ means the opposite.

Interestingly, our results show that increasing the number of female first proposals or eliminating the bias males display in Valencia is relatively ineffective. In both samples, our calculations suggest that when female behavior is set at male mean levels in terms of making and accepting counter-proposals the gender gap shrinks substantially, and virtually closes in Maastricht. This exercise further underscores the importance of analyzing the bargaining dynamics beyond the opening offer to understand an existing gender gap in earnings. We are cautious, though, about the *policy implications* one may derive from these findings because, ultimately, one should conduct direct experimental tests in which each channel is experimentally manipulated before suggesting any policy intervention. One concern is that the aggressiveness of female counteroffers may respond endogenously to the degree of male bias in selecting coalition partners, something which is consistent with our data (more bias and less gender difference in counteroffer behaviour in Valencia than in Maastricht).

4.2 Did Participants Notice the Gender Composition?

In a debriefing question, we find that 72% and 68% of the participants reported that they did not notice the silhouettes in the *Maastricht* and *Valencia* experimental sessions, respectively. However, we

are cautious about interpreting these answers. Because we also find evidence for explicit discrimination in explaining the gender gap in earnings, this indicated that using silhouettes to prime gender was not necessarily unsuccessful. That is, despite participants' (negative) answer to the manipulation check, we cannot rule out that: (1) they did not notice consciously, but the effect is subconsciously operating, and (2) they noticed the silhouettes but lied about it to avoid being labeled as sexist or discriminatory.

In Table 7, we check for discrimination in first offers, controlling for whether or not the offerer correctly stated their bargaining partners' genders in the post-experimental questionnaire. In the MMF treatment of the *Valencia* experiment, where we observed the strongest evidence of same-gender bias, only men who report that did not notice they are interacting with one male and one female, significantly favor males. We take this as evidence that those who discriminated wished to hide it.

Table 7: Linear Regression for First Offer to Male

	Maastricht		Valencia	
	FFM (females only)	MMF (males only)	FFM (females only)	MMF (males only)
Noticed Correctly	-0.120	-0.106	-0.108	-0.097
	(0.078)	(0.081)	(0.062)	(0.083)
Constant	0.548***	0.465***	0.563***	0.573***
	(0.055)	(0.039)	(0.032)	(0.023)
H0: Constant=0.5				
F-stat	0.76	0.81	3.79*	10.56**
H0: Constant+Noticed Correctly=0.5				
F-stat	0.56	4.80*	0.82	0.13
N	118	194	155	248
R^2	0.01	0.01	0.01	0.01

Standard errors clustered at the matching group level. * p<0.1, ** p<0.05, *** p<0.01

4.3 Do Personal Characteristics Explain Differences in Payoffs?

Another question that naturally arises is whether the gender disparity in earnings can be explained by gender differences in personal characteristics that likely influence behavior in multilateral bargaining. To examine this aspect, we checked for a gender effect on earnings, controlling for cognitive ability (using the three-question cognitive reflection test), self-reported risk preferences, altruism, enjoyment derived from competing, and enjoyment derived from winning. For succinctness, we pool data from both heterogenous groups in both locations. In Table 8, we see that while many of these variables are significant and their inclusion explains part of the gender effect, the residual effect

remains sizeable and statistically significant. This suggests that the gender disparities we observe cannot be fully explained by commonly considered personal characteristics.

Table 8: Linear Regression for Share of the Surplus (in points) Earned

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.496***	0.471***	0.475***	0.386***	0.466***	0.470***	0.314**
	(0.121)	(0.116)	(0.122)	(0.130)	(0.121)	(0.116)	(0.131)
Risk		0.0263					0.0162
		(0.0188)					(0.0182)
Altruism			-0.0607***				-0.0430*
			(0.0193)				(0.0223)
CRT				0.146***			0.140***
				(0.0457)			(0.0456)
Enjoys Competing					0.0529*		0.0474*
					(0.0263)		(0.0268)
Enjoys Winning						0.0884**	0.0643
						(0.0393)	(0.0398)
Constant	3.752***	3.606***	4.191***	3.598***	3.520***	3.298***	3.286***
	(0.0638)	(0.134)	(0.164)	(0.0624)	(0.133)	(0.241)	(0.425)
N	3,960	3,960	3,960	3,960	3,960	3,960	3,960
R^2	0.008	0.009	0.011	0.012	0.009	0.010	0.016

Risk and Altruism are self-reported attitudes on a scale from 0 (low) to 10 (high). CRT refers to the number of correct answers (0-3) to the standard Cognitive Reflection Task questions. Enjoys Competing and Enjoys Winning variables are self-reported willingness to compete and win respectively on a scale 1 (strongly disagree) - 7 (strongly agree).
Robust standard errors in parentheses, clustered at the Subject level. Pooling both locations. *** p<0.01, ** p<0.05, * p<0.1 .

4.4 The Role of Culture

The role of cultural differences in bargaining behavior has been widely recognized in economics (see Roth et al. (1991) and Henrich (2000) for evidence from ultimatum games). However, establishing a correlation between external measurements of general cultural traits[21] and bargaining behavior has been an unfruitful endeavor to the best of our knowledge. In a meta-analysis of ultimatum games containing data from all over the world, Oosterbeek et al. (2004) find that none of Hofstede et al.'s 2005 measures correlate with average transfers. Moreover, conducting a meaningful analysis of the effect of cultural traits on bargaining dynamics is evidently not possible with only two countries in our sample.

Ultimately, our results are a proof of existence, that different mechanisms can underlie the same gender gap in majoritarian bargaining. We find that there are both commonalities and interesting

[21] See for example Hofstede et al. (2005) for five variables that may presumably help delimit cultural boundaries.

behavioral differences between subject pools from two different countries. Because we are conducting identical procedures with identical incentives (as in Roth et al. (1991); Henrich (2000)), only two possible explanations are left: that our samples differ in their composition (i.e., majors that students are enrolled in, for example) or cultural differences. Further research may shed light on how cultural traits affect majoritarian bargaining outcomes by determining sample-selection criteria *a priori* and setting forth testable hypotheses.

5 Concluding Remarks

Collectively, the results from our experiments demonstrate that gender, and the gender composition of a bargaining committee, affect the dynamics of negotiations and agreements reached. Importantly, men and women employ different bargaining strategies. Our study documents the existence of a gender gap in earnings in majoritarian bargaining: Men earn more than women, a finding which holds in two different subject pools. We identify three underlying mechanisms explaining this gap, which differ in importance in the two groups of subjects. First, men are more likely to make the opening offer, which enhances their odds of being part of a winning coalition. Interestingly, the first-mover advantage is enjoyed by men as women do not benefit, and may even suffer backlash, for proposing first.

Second, gender differences in the bargaining process also play a role in explaining differentials in earnings. When a preliminary alliance between a male and a female subject forms, these are quite unstable in male-majority treatments. Their dissolution leads to the subsequent formation of a male-male alliance, and as such, mixed-gender alliances are less likely to be ratified.

A third mechanism explaining the gender gap is discrimination, for which we find strong evidence in the Spanish subject sample. In particular, we find that men tend to partner with each other in male-majority triads more than expected by chance, whereas women do not display such behavior when they are in majority. Male-male MWCs generally end in agreement (close to 70% of the time) in male-majority triads.

Insofar as our results extend to other populations, they suggest that the preferences of females in male-dominated top management and self-managing teams will be under-weighted in outcomes. External validity is less of a concern in the latter, as many members of our subject pool are likely to work in such teams in the future. Employers concerned about ensuring all views are given equal weight, or fairness of outcomes in, for example, distribution of tasks within a team, should be mindful of the gender-makeup of teams, or consider putting in place formal protocols for decision-making that minimize the impact of the channels we have identified. Further experiments can shed light as to the effectiveness of such institutional modifications.

Relatedly, several previous studies find that the gender composition of a group also affects outcomes in other domains. Specifically, Bourreau-Dubois et al. (2020) find that all-women French judge panels impose higher child support payments than all-male or mixed-gender panels. Boyd

et al. (2010) find that males in judge panels lacking women are less likely to rule in favor of plaintiffs in cases of discrimination in the United States. Apesteguia et al. (2012) report results from a management training game played in groups and finds that groups of three women are more likely to invest in corporate social responsibility programs compared to other group compositions. Besides the problem of non-random allocation into groups for establishing causality, the three previous settings have one aspect in common, which differentiates them from our study: the resulting decisions have consequences over third parties. We argue, however, that generosity toward others will display the same increasing pattern in the number of women in the committee. Recent work by Cason et al. (2021) reveals that increasing female representation in groups leads to higher pro-social outcomes in a coordination game. Further experimental work is needed to understand how exogenous variation in the gender composition of a committee affects bargaining outcomes when the decisions being made have consequences for uninvolved parties.

In closing, three decades of experimental investigations on gender differences in bargaining have focused on bilateral settings and little is known about gender differences in multilateral bargaining. We report the existence of a gender gap and identify plausible behavioral mechanisms that can give rise to it. We view this exploratory examination of the detailed bargaining dynamics as what Alvin Roth refers to as a "search for facts" (Roth, 1995). Having identified these plausible mechanisms, we leave for future work experiments specifically designed for testing related hypotheses. Also, investigating richer settings, such as those where power and status differentials between men and women exist, will help bring the laboratory environment closer to real-world settings where such gender differentials are observed (Babcock and Laschever, 2009; Sandberg, 2013).

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A Supporting Tables and Figures

Table A1: Proportion of MWCs by Treatment (Maastricht)

VARIABLES	(1) MWC	(2) MWC	(3) MWC	(4) MWC
FFM	-0.000385		0.00110	
	(0.0756)		(0.0767)	
MMF	0.0937		0.0919	
	(0.0598)		(0.0601)	
MMM	0.122***		0.125***	
	(0.0452)		(0.0459)	
Number of Females		-0.0503***		-0.0518**
		(0.0195)		(0.0203)
Period of Play			0.0294***	0.0294***
			(0.00534)	(0.00541)
p-values for Wald Tests				
FFM v MMF	0.215		0.236	
FFM v MMM	0.039**		0.038**	
MMF v MMM	0.589		0.520	
Observations	1,128	1,128	1,128	1,128

Probit regressions reporting marginal effects. FFF is the base level.

Standard errors clustered at the matching group level reported in parentheses.

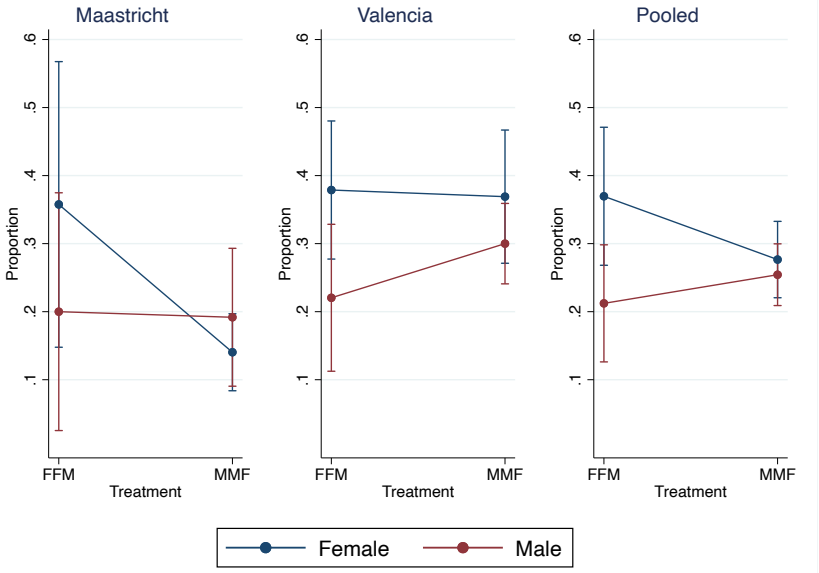
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Linear Regression for Share of the Pie Received by Subjects making the Opening Offer (Pooled for both Samples)

	(1)	(2)
Male First Mover (=1 if yes)	0.050***	0.049***
	(0.016)	(0.016)
MMF	-0.030	-0.031
	(0.027)	(0.027)
MMF × Male	0.014	0.016
	(0.034)	(0.034)
Share demanded (as proportion)		0.063
		(0.063)
Constant.	0.329***	0.298***
	(0.014)	(0.031)
N	1320	1320
F-stat	4.602	5.692
R^2	0.014	0.014

Robust standard errors in parentheses, clustered at the matching group level. Treatment FFM is the base level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure A1: Proportion of Grand Coalitions First Proposals, by Gender



Notes: The y-axis measures the proportion of the opening proposals in which all members are being offered a positive share. 95% intervals, clustering standard errors at the matching group level.

Table A3: Fate of Initial (Temporary) MWC Agreements

	FFM		**MMF**	
	Composition of MWC		**Composition of MWC**	
	(MF)	**(FF)**	**(MF)**	**(MM)**
MAASTRICHT				
Same coalition partners				
Implemented as is	94 (69%)	48 (75%)	92 (60%)	57 (72%)
Renegotiated	3 (2%)	2 (3%)	12 (8%)	6 (8%)
New coalition partners				
New MF	16 (12%)	14 (22%)	18 (12%)	15 (19%)
New FF	17 (13%)	n.a.	n.a.	n.a.
New MM	n.a.	n.a.	27 (18%)	n.a.
GC	6 (4%)	0 (0%)	4 (3%)	1 (1%)
Num. Obs.	136	64	153	79
VALENCIA				
Same coalition partners				
Implemented as is	148 (68%)	35 (48%)	103 (54%)	72 (72%)
Renegotiated	4 (2%)	3 (4%)	11 (6%)	6 (6%)
New coalition partners				
New MF	25 (11%)	31 (42%)	31 (16%)	21 (21%)
New FF	33 (15%)	n.a.	n.a.	n.a.
New MM	n.a.	n.a.	28 (15%)	n.a.
GC	9 (4%)	4 (5%)	18 (9%)	1 (1%)
Num. Obs.	219	73	191	100

Table A4: Counteroffer after Initial (Temporary) MWC Agreement Formed

	FFM		**MMF**	
	Composition of MWC		**Composition of MWC**	
	(MF)	**(FF)**	**(MF)**	**(MM)**
Panel A: MAASTRICHT				
Counteroffer made by:				
Men in provisional agreement	11 (8%)	n.a.	18 (12%)	14 (18%)
Women in provisional agreement	12 (9%)	10 (16%)	10 (7%)	n.a.
Excluded member	102 (75%)	47 (73%)	117 (76%)	56 (71%)
No counteroffer made	11 (8%)	7 (11%)	8 (5%)	9 (11%)
Num. Obs.	136	64	153	79
Counteroffers by Excluded Member				
Propose a GC	31 (30%)	6 (13%)	16 (14%)	12 (21%)
Propose a MWC to F	37 (36%)	36 (77%)	53 (45%)	n.a.
Propose a MWC to M	22 (22%)	n.a.	36 (31%)	39 (70%)
Other	12 (12%)	5 (11%)	12 (10%)	5 (9%)
Num. Obs.	102	47	117	56
Panel B: VALENCIA				
Counteroffer made by:				
Men in provisional agreement	12 (5%)	n.a.	16 (9%)	18 (18%)
Women in provisional agreement	17 (8%)	20 (28%)	21 (11%)	n.a.
Excluded member	179 (82%)	52 (72%)	146 (80%)	80 (82%)
No Offer is made	11 (5%)	1 (1%)	8 (4%)	2 (2%)
Num. Obs.	219	73	191	100
Counteroffers by Excluded Member				
Propose a GC	59 (33%)	9 (17%)	40 (27%)	20 (25%)
Propose a MWC to F	55 (31%)	33 (63%)	54 (37%)	n.a.
Propose a MWC to M	44 (25%)	n.a.	37 (25%)	49 (61%)
Other	21 (12%)	10 (17%)	15 (10%)	11 (14%)
Num. Obs.	179	52	146	80

B Stylized model for the counterfactual analysis

In this section, we describe in more detail the stylized model of bargaining behavior presented in the paper, and that we use to perform the counterfactual analysis reported in the paper. The purpose of this model is to incorporate the main forces underlying the gender gap that we have uncovered while retaining tractability and conciseness.

Consider the following timeline:

1. One player is randomly chosen to make the first proposal. The player is a male with probability p_m.

2. A proposal is made. If a male is the first proposer, the proposal is made to the other male with probability b (and the offer in the proposal is immediately accepted by the recipient, which means that a temporary coalition forms with probability 1).

3. A counteroffer is made by the excluded player with probability c_m (c_f) if the excluded player is male (female). Each player in the initial coalition is equally likely to be the target of the counteroffer.

4. The counteroffer is accepted (i.e., the old coalition dissolves and a new one forms) with probability a_m (a_f) if the target of the counteroffer is male (female).

5. If the counteroffer is accepted, it is implemented (i.e., bargaining ends), otherwise the counteroffer passes to the remaining coalition member who accepts it with the same probabilities (a_m if male or a_f if female).

6. If neither coalition member accepts a counteroffer, the initial proposal is implemented.

We now proceed to derive the probability that a male-male final coalition is implemented, given the timing of the game as a function of the parameters just described. In the following table, we present each possible contingency under which a male-male MWC forms and its associated likelihood of occurrence.

Table B5: Contingencies under which Male-Male Coalitions Form in MMF in our Simplified Bargaining Game

Contingency	Probability
1. Probability that a male proposes first and...	
(1.a) makes an offer to the other male, and female doesn't counteroffer	$p_m \cdot b \cdot (1-c_f)$
(1.b) makes an offer to the other male, female makes counteroffer, and neither male accepts	$p_m \cdot b \cdot c_f \cdot (1-a_m)^2$
(1.c) makes an offer to the female, excluded male makes counteroffer to a male, which is accepted	$p_m \cdot (1-b) \cdot c_m \cdot \frac{1}{2} \cdot a_m$
(1.d) makes an offer to the female, excluded male makes counteroffer to female who rejects, then the male accepts	$p_m \cdot (1-b) \cdot c_m \cdot \frac{1}{2} \cdot (1-a_f) \cdot a_m$
2. Probability that a female proposes first and...	
(2.a) excluded male makes counteroffer to a male, which is accepted	$(1-p_m) \cdot c_m \cdot \frac{1}{2} \cdot a_m$
(2.b) excluded male makes counteroffer to a female who rejects, then the male accepts	$(1-p_m) \cdot c_m \cdot \frac{1}{2} \cdot (1-a_f) \cdot a_m$

Thus, the total probability of observing a male-male MWC is given by

$$MWC_{MM} = p_m b(1-c_f) + p_m b c_f (1-a_m)^2 + p_m (1-b) c_m (a_m - \frac{a_m a_f}{2}) + (1-p_m) c_m (a_m - \frac{a_m a_f}{2}) \quad (1)$$

Note that equation (1) has two unknowns: a_m and a_f. All the other parameters are matched from the data as explained in the body of the paper. Here we discuss why it is not possible to match the probability of accepting a counteroffer (a_m and a_f). In the actual experiment, when a counter-offer is made, another member may suddenly make a different counter-offer which then causes the initial counter-offerer to retract. It may also happen that a member of the temporary coalition proposes a new division virtually at the same time at which he/she was being the target recipient of a counter-offer. These variables, thus, are hard to identify from the data. Instead of attempting to consider all possible scenarios for these events (which would result in few observations per event), we will back out their values by considering a second independent equation: the probability that an initial coalition ends in agreement.

To derive the probability that an initial coalition is implemented we proceed as before by explaining each possible contingency and its associated likelihood of occurrence.

Table B6: Contingencies under which the First Temporary Agreement is Implemented in our Simplified Bargaining Game

Contingency	Probability
1. Probability that a male proposes first and...	
(1.a) makes an offer to the other male, and female doesn't counteroffer	$p_m \cdot b \cdot (1-c_f)$
(1.b) makes an offer to the other male, female makes counteroffer, and neither male accepts	$p_m \cdot b \cdot c_f \cdot (1-a_m)^2$
(1.c) makes an offer to the female, and there is no counteroffer	$p_m \cdot (1-b) \cdot (1-c_m)$
(1.d) makes an offer to the female, and counteroffer is rejected by both	$p_m \cdot (1-b) \cdot c_m \cdot (1-a_m) \cdot (1-a_f)$
2. Probability that a female proposes first and...	
(2.a) there is no counteroffer	$(1-p_m) \cdot (1-c_m)$
(2.b) and counteroffer is rejected by both recipients	$(1-p_m) \cdot c_m \cdot (1-a_m) \cdot (1-a_f)$

Thus, the total probability of observing that first agreement ends in approval is given by

$$\begin{aligned} P_{\text{First}} = {} & p_m b(1-c_f) + p_m b c_f (1-a_m)^2 + p_m (1-b)(1-c_m) + \\ & p_m (1-b) c_m (1-a_m)(1-a_f) + (1-p_m)(1-c_m) + (1-p_m) c_m (1-a_m)(1-a_f) \end{aligned} . \tag{2}$$

To obtain the implied values of a_m and a_f, we solve these two equations numerically. In the supplementary materials, we include the code that we used to do so for replication purposes.