Life Course Centre

Who wants to move first?

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Research Summary

Why was the research done?

We conducted this research to determine whether there are gender differences in individuals' willingness to take the initiative, specifically in the context of bargaining with a first-mover advantage. We sought to investigate if women are less likely to move first than men. We also aimed to examine the role of gender norms and psychological costs associated with deviating from these norms in the decision to be the first mover.

What were the key findings?

We found that, contrary to standard economic predictions, a significant portion of participants (40%) avoided choosing to make the first offer in our bargaining setting even though it was advantageous to do so. Importantly, women were found to be 18% less likely than men to choose to move first. The study also revealed descriptive gender norms suggesting that people believe women are less likely to choose the first-mover role than men. Alternative explanations, such as lack of strategic reasoning or differences in risk preferences, were not supported by the data.

What does this mean for policy and practice?

Our findings highlight the need for policies and practices that address the observed reluctance of women to move first. The reluctance among women to move first, despite the potential financial advantages, could contribute to gender disparities in pay and career progression. Our results suggest that existing gender norms play a role in shaping these behaviors and that efforts should be made to challenge or change these norms. Policies that focus on changing the perception of how female peers behave can be potentially beneficial in encouraging more women to move first. This may be achieved, for instance, through exposure to role models or by defaulting women into moving first. Overall, this research underscores the importance of understanding and addressing gender-specific behaviors in decision-making to promote greater gender equality in various aspects of professional life.

Citation

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Abstract

The willingness to make the first move can place one in an advantageous position when negotiating and is often a necessary quality for advancing within organizations. In a sequential bargaining game with a first-mover advantage, we find that women are more reluctant to move first than men. The gender difference is consistent with observed gender gaps such as wage inequality and glass ceilings in the labor market. Our data suggests that descriptive gender norms, such that women believe that more female than male participants choose not to move first, may contribute to the gender difference in the reluctance to being the first mover. Furthermore, we find no gender gap in the decision to move second in a sequential bargaining game with a second-mover advantage. Overall, our findings are consistent with women's pure role preference against being the first mover driving their actions rather than them being averse to taking the advantageous position.

1. Introduction

Gender gaps are observed in a variety of contexts. For example, compared to men, women are paid less (Blau et al., 2013; Gobillon et al., 2015; Olivetti & Petrongolo, 2016) and work on non-promotable tasks in the workplace more frequently (Babcock et al., 2017). Women are also underrepresented in leadership positions (Bertrand & Hallock, 2001; Blau & Kahn, 2017; Eckel et al., 2021), and in entrepreneurship (Ewens, 2022; Guzman & Kacperczyk, 2019; Howell & Nanda, 2019). Succeeding in these contexts often requires one to take initiative (i.e., move first) to pursue advantageous positions. For instance, an employee must initiate negotiations to receive a raise (Galinsky & Mussweiler, 2001; Gunia et al., 2013; Ochs & Roth, 1989; Yukl, 1974). In work groups, first movers can assign themselves to preferable tasks that are more likely to lead to promotions, leaving laggards with less preferable or non-promotable tasks to complete. Importantly, the first mover position in these settings is typically at the discretion of the individuals involved. Despite the extensive literature on bargaining and negotiation[1], we have a limited understanding of the individual differences in the decision to be the first mover. In this paper we investigate the gender differences in the choice of taking the first mover position. If women are less willing to move first than men despite the first-mover advantage[2], such a gender difference may help to explain the gender wage gaps and glass ceilings that persist in the labor market.

Sociologists have long contended that most human activities are conducted within socially prescribed categories or roles, such as motherhood, managerial positions, or teaching. Social role theory posits that people hold the belief that women and men occupy distinct societal roles based on gender (Eagly, 1987; Eagly & Wood, 2012). Taking a role that deviates from the norm may result in psychological costs associated with the role (Azmat & Petrongolo, 2014; Babcock & Laschever, 2004; Bowles et al., 2007; Kugler et al., 2018; Marianne, 2011; Mazei et al., 2015). Perceived incongruence with gender norms and anticipated backlash have been identified as drivers in other contexts where women show reluctance to take initiative. We hypothesize that there can be gender specific norms associated with the role women (men) take in negotiation and women and men differ in the potential psychological cost associated with taking the first mover role. As a result, there will be gender differences in the choice to move first.

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[1] See Azmat & Petrongolo (2014), Babcock & Laschever (2004), Bowles et al. (2007), Hernandez-Arenaz & Iriberri (2019), Kugler et al. (2018), Marianne (2011) and Mazei et al. (2015).
[2] Moving first is not always monetarily advantageous, e.g., in the case of the volunteer's dilemma. In this paper we are primarily interested in situations where moving first is an advantage.

To test our hypothesis, we start with a sequential bargaining game with a first-mover advantage (Study 1). Participants choose whether they want to play the sequential bargaining game in the role of the first mover or the responder (the second mover). The first mover makes an offer to the responder, which the responder can accept or reject. If the responder rejects the first mover's offer, the asset's value depreciates and the responder makes a counteroffer, which the first mover can accept or reject. If the first mover rejects the responder's counteroffer, the asset's value depreciates further, and both the first mover and the responder receive an equal share of the asset.

While standard economic theory predicts a payoff-maximizing agent should always choose to move first in this game, we develop a behavioral framework that allows for "role preference". This framework predicts that a role-sensitive agent who incurs a sufficiently high psychological cost of choosing to move first instead of moving second (a strong first-mover averse type) will incur a non-monetary cost when choosing to be the first mover. Our data reveals that 40% of participants avoid choosing to be the first mover. Importantly, women are 18% less likely to choose to move first as compared to men. As first movers earn more money than responders in expectation, the gender difference in the reluctance to be the first mover adversely affects women.

Our hypothesis is built on the assumption that there are psychological costs associated with being the first mover resulting from deviation from the gender specific norm associated with the role choice. Consequently, we elicited the beliefs of the gender norms in the decision to move first to explore this assumption. We survey the beliefs from both participants who have played the bargaining game and a separate group of participants who do not play the game. The data on beliefs reveals a descriptive gender norm that people think women are significantly less likely to choose the first mover role than men. Furthermore, there is a strong correlation between the likelihood that an individual chooses to move first and beliefs about descriptive gender norms (i.e., what other female/male participants actually do). Interestingly, we do not find evidence for an injunctive gender norm in terms of whether women, more than men, should take the second mover role. Nor do we observe a relationship between injunctive gender norms and the propensity to move first. Alternative explanations for women's reluctance to move first including a lack of understanding of the first-mover advantage (i.e., lower depth of strategic reasoning), fairness concerns, or differences in risk preferences are not supported by our data.

While the data is consistent with the hypothesis that women incur a relatively higher psychological cost of moving first (i.e., strong first-mover aversion) than men, there can be psychological costs associated with choosing the advantageous position. In other words, the

choice of moving second can be driven by advantageous position aversion, rather than first-mover aversion. To differentiate between these potential mechanisms, we conduct Study 2 where we redesign the sequential bargaining game such that in equilibrium moving second is advantageous. The data from studies 1 and 2 suggest that the gender difference in the willingness to move first cannot be attributed to women being more likely to be advantageous position averse than men. We observe no gender differences in the role choices in Study 2. Hence, taken together, the two studies provide evidence for women's pure first-mover aversion.

We contribute to the literature by identifying gender differences in the decision to move first and providing evidence for the existing descriptive gender norm that women do not move first.

Our findings complement the literature on gender inequality in labor markets. Previous research has identified significant behavioral differences between men and women in various domains that contribute to the persistent gender gap in the labor market. For instance, women shy away from initiating negotiations which contributes to the gender pay gap (Babcock & Laschever, 2021; Biasi & Sarsons, 2021; Hernandez-Arenaz & Iriberri, 2019; Recalde & Vesterlund, 2022). It is also well documented that women are less likely to seek promotions and are reluctant to take on leadership positions (Alan et al., 2019; Erkal et al., 2022; Fox & Lawless, 2004; Litzky & Greenhaus, 2007; Preece & Stoddard, 2015). Relatedly, women are less represented as entrepreneurs in the start-up space (Brindley, 2005; Estrin & Mickiewicz, 2011; Ewens, 2022). While these findings may hint at women's reluctance to be the first mover, no empirical studies have been conducted to provide direct evidence. We address this question using a setting where there is an unambiguous monetary advantage of being the first mover. Our research strategy uses experimental methods which allow us to make causal inferences about gender differences and to collect data on all possible contingencies that arise in the bargaining process, which can be difficult to obtain in the field. Our findings illustrate the need for policies that either remove the hurdle for women to move first to succeed or change gender norms around the choice to move first.

Previous research by Babcock et al. (2017) and Baranski et al. (2023) has identified gender differences in role preference in contexts different from the one studied in this paper. Baranski et al. (2023) find that women make first offers less frequently than men in a multilateral bargaining setting. Our experiment differs from Baranski et al. (2023) in several crucial ways. Apart from the fact that moving first is not beneficial for women, they do not explore the role of gender norms. We find strong evidence suggesting it may drive the reluctance of women to move first. In their experiment, participants' gender is revealed. In

contrast, gender of the other players is not revealed in our experiment. As a result, we mitigate concerns about higher order beliefs (e.g., anticipated backlash) influencing behavior. We also do not find that women bargain differently than men, meaning that the gender difference in payoffs is solely the result of women's reluctance to move first.

Unlike Babcock et al. (2017), we find that women are more reluctant to move first in our bargaining setting. This is likely due to the fact that in their setting there are prosocial concerns whereas in ours there are not. Hence, our findings in combination with Babcock et al. (2017) suggest that providing women with prosocial motives could be crucial in encouraging women to move first when it is beneficial to move first.

We also contribute to the growing literature on gender norms (Alkhuzam et al., 2023; Amanatullah & Tinsley, 2013; Bursztyn et al., 2020, 2023). Alkhuzam et al. (2023), Bursztyn et al. (2020), and Bursztyn et al. (2023) outline how misperceptions of gender norms may impede progress toward gender equality in the labor market. Whereas Amanatullah & Tinsley (2013) argue that women suffer from backlash while negotiating when they violate prescriptive gender roles. The aforementioned research, measured injunctive norms, as opposed to descriptive norms. The difference between the descriptive and the injunctive norm is that while the latter asks about how individuals should act (an ideal) the former provides an understanding about how people expect others to really act. In this paper, we measure both types of norms and find no evidence to suggest that the decisions made in our studies were motivated by an injunctive gender norm. However, we do find evidence for the presence of a descriptive gender norm driving the choice to move first in our bargaining setting. Our results highlight the importance of measuring both injunctive and descriptive norms for understanding the mechanisms behind gender inequality and determining the appropriate policy to reduce it.

2. Study 1

2.1. A sequential bargaining game with a first-mover advantage

Sequential bargaining games have been studied extensively as they capture realistic aspects of interactions in various markets e.g., asset markets and labor markets (Rubinstein & Wolinsky, 1985). We design a sequential bargaining game with a built-in first-mover advantage. In this game, two players must determine how to divide an asset. The game consists of three decision stages.

Stage 0: In stage 0 each player simultaneously chooses whether to be the first mover or the responder. If players select different roles, then each player is assigned to the role they chose. If players select the same role, then roles are randomly assigned.

Stage 1: In stage 1, the asset is worth £10. The first mover must offer either £4.50 or £5 to the responder. If the responder accepts, the first mover receives £10 minus the number of pounds offered, and the responder receives the number of pounds offered. If the responder rejects, the game moves to stage 2.

Stage 2: In stage 2 the asset is worth £8 instead of £10. The responder must offer either £3 or £4 to the first mover. If the first mover accepts, the first mover receives the number of pounds offered, and the responder receives £8 minus the number of pounds offered. If the first mover rejects, both players receive £3.50.

For an illustration of the game structure after the roles have been assigned see Figure 1.
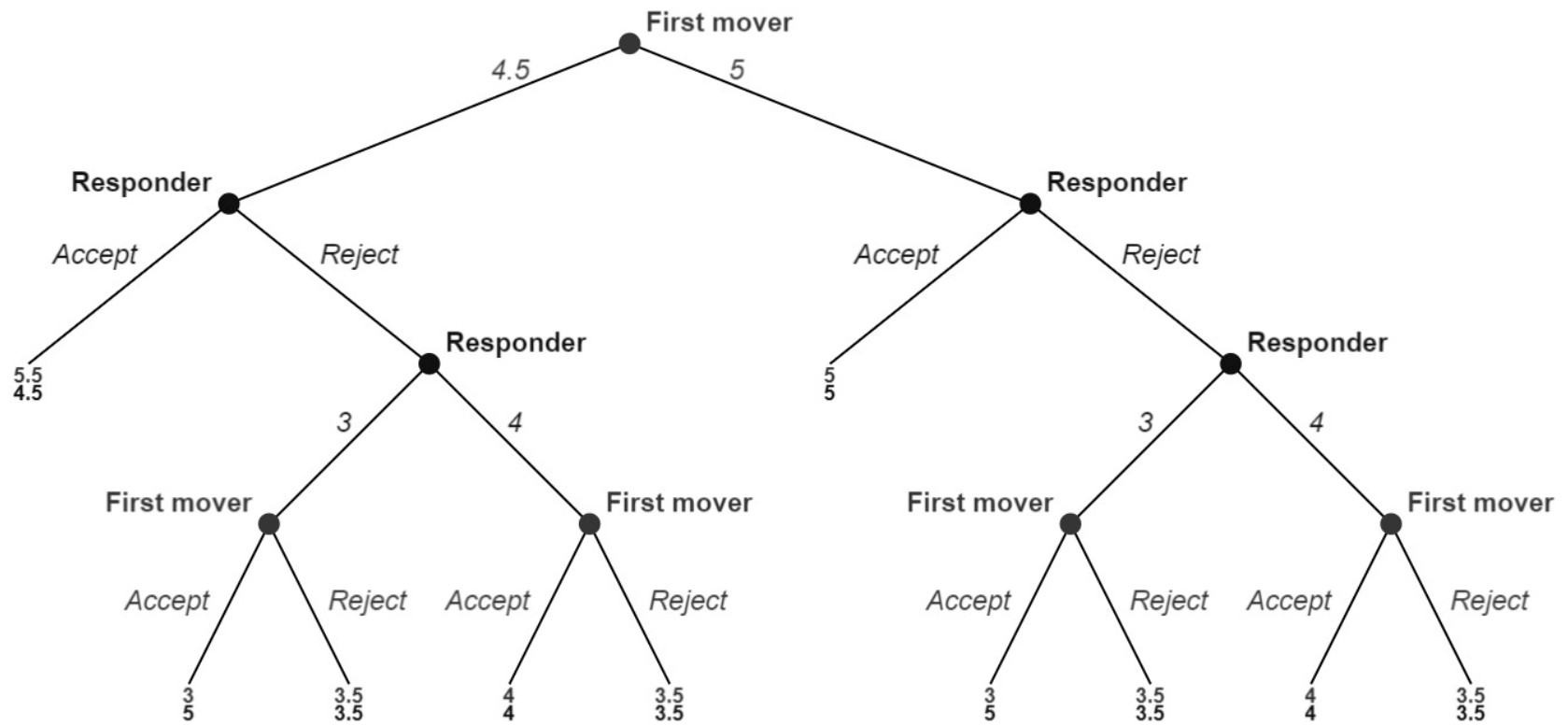
Figure 1: Game structure after role assignment in Study 1

2.2. Hypothesis

In this section, we first identify how a rational agent should always choose to be the first mover in the subgame perfect equilibrium using standard economic theory. We then construct a new theoretical framework that considers role preference and derive a role-preference-based hypothesis. In Appendices C, D, and E we demonstrate theoretically that other potential behavioral factors such as prosocial preferences (altruism and inequality aversion) and risk preferences cannot lead one to prefer to be the responder instead of the first mover.[3]

We begin by deriving the best response for each player in stage 2, then stage 1, and finally stage 0.

Stage 2: Given the first mover receives £3.50 if they reject the responder's offer, the first mover will reject an offer of £3 and accept an offer of £4. Expecting such a response from the first mover, the responder will offer £4 to the first mover as otherwise they receive only £3.50.

Stage 1: The responder will accept both £4.50 and £5 as these amounts are greater than £4, the amount they will receive in stage 2 if they reject the offer in stage 1. Given this, the first mover will offer £4.50 to the responder.

Stage 0: Given the above analysis of stage 1 and stage 2, both players will choose to be the **first mover**. In this case, one of them will be randomly selected to be the first mover and the expected payoff $= 0.5 \cdot £5.50 + 0.5 \cdot £4.50 = £5$, which is greater than the payoff of choosing to be the responder (£4.50).

To summarize, the Subgame Perfect Equilibrium is as follows:

Stage 0: Role choice = First mover, for both players.

Stage 1: (Offer, Response) = (£4.50, Accept).

Stage 2:

$$\text{Counteroffer} = £4,$$

$$\text{Response} = \begin{cases} \text{Accept} & \text{if Counteroffer} = £4, \\ \text{Reject} & \text{otherwise.} \end{cases}$$

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[3] We also test these explanations empirically and show that none of these can explain the choice to move first. Another possible reason is the incomprehension of the first-mover advantage. We test this possibility in our empirical analysis.

The equilibrium payoff for the first mover is £5.50 which is greater than the equilibrium payoff for the responder £4.50. According to the equilibrium outlined above, a payoff-maximizing player should always choose to be the first mover.

2.2.1. A framework with role preference

We now consider a framework where individuals have a preference over which role to adopt. Social role theory proposes that people believe women and men occupy distinct societal roles based on gender (Eagly, 1987; Eagly & Wood, 2012). Adopting a role that deviates from the norm may result in psychological costs (Azmat & Petrongolo, 2014; Babcock & Laschever, 2004; Bowles et al., 2007; Kugler et al., 2018; Marianne, 2011; Mazei et al., 2015). Thus, we hypothesize that there are psychological costs associated with the choice of whether to move first or second.

Let's denote the relative psychological cost of choosing to be the first mover instead of the responder as θ. We assume these preferences over psychological costs are common knowledge. There could be two types of role-sensitive agents: first-mover averse types whose $\theta > 0$; and responder averse types whose $\theta < 0$. In contrast, rational agents are those whose role decision is purely determined by the payoff-maximizing strategy and do not incur any psychological cost of the role per se (i.e., $\theta = 0$). For simplicity, we do not consider the possibility of another type whose $\theta = 0$ who incurs a psychological cost of each role but dislikes them equally.[4] That is, only rational agents have $\theta = 0$. Without loss of generality suppose player 2 chooses to be the responder. By adapting the solution stated previously we know that player 1 will also choose to be the responder if the following holds:

$$U_{FM} - U_R = 5.5 - \theta - (0.5(5.5 - \theta) + 0.5 \cdot 4.5) = 0.5(1 - \theta) < 0$$
$$\Rightarrow \theta > 1$$

We identify four role preference types and the corresponding role choices below.

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[4] In our experiment, this type means one would rather withdraw and not play the game. We do not observe such a case. Some participants may have been indifferent between these two roles but were not able to explicitly indicate this in our survey. To make sure that this did not influence our results we analyse responses to an open-ended question where subjects were asked to provide a reason for their role choice. We identified 19 participants in Study 1 who stated they were indifferent between the two roles. Excluding these subjects from our analysis did not influence our results.

Strong first-mover averse agents whose $\theta > 1$ will choose to be the responder despite the first-mover advantage.

Weak first-mover averse agents whose θ is positive but relatively small such that $0 < \theta \leq 1$ will choose to be the first mover, just like the rational agents.

Rational agents whose $\theta = 0$ will choose to be the first mover.

Responder averse agents whose $\theta < 0$ will choose to be the first mover, just like the rational agents.

Thus, based on the previous social role preference theory, our first hypothesis is as follows.

Hypothesis 1: *Despite a first-mover advantage, a significant proportion of participants will choose to be the responder.*

Furthermore, we posit that there is a gender difference in the role preference types because the psychological costs come from deviating from a norm associated with their gender. Previous literature suggests that women shy away from moving first within the context of leadership (Alan et al., 2019; Born et al., 2022; Erkal et al., 2022). Studies have also indicated that leaders are perceived as masculine (Koenig et al., 2011; Powell et al., 2002). Thus, in our context, if there are gender norms that lead to more women being the strong first-mover averse type, we will observe women being more likely to choose to be the responder than men. Hence, our second hypothesis is as follows.

Hypothesis 2: *Women will choose to be the responder more often than men.*

2.3. Experimental design

Study 1 consisted of two phases. Phase 1 consisted of four tasks. In task 1, participants received instructions related to the sequential bargaining game as described above. We employed the strategy method.[5] Specifically, after selecting their role, every participant was asked about how

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[5] Participants were only aware of our implementation of the strategy method after they selected their role. Consequently, their role choice could not have been affected by our implementation of the strategy method.

they would respond to all possible contingencies in each role. Participants answered two screening comprehension questions about the task and had two attempts to answer the questions correctly. Consistent with our pre-registered plan, participants who answered either of the two comprehension questions incorrectly on both attempts were excluded from our sample. Note, we did not reveal the gender of participants in our study. This was for two reasons: (i) for the purpose of addressing our main research question it was not necessary, and (ii) it could introduce experimenter demand effects. This allows us to rule out that anticipated backlash (see Exley & Kessler, 2022) influenced role choices and decisions throughout the game.

In task 2, participants were asked to answer a series of questions about the sequential bargaining game. The main purpose of this task was to explore the potential reason for the role choice in task 1. Our hypothesis is built on the presumption of psychological costs associated with being the first mover such as the costs incurred when deviating from the norm. We thus elicited norm beliefs related to the choice of moving first in task 2. Following previous research on social norms (Bicchieri, 2005; Bicchieri & Xiao, 2009; Cialdini et al., 1991), we elicit both descriptive and injunctive gender norms. For descriptive gender norms, we asked participants to guess the percentage of women that chose to be the first mover (and responder) in the sequential bargaining game. We asked the same question related to the role choices of men in the game. Participants could earn £1 if their guess was correct within a 10% range based on the outcome in phase 1. To elicit injunctive gender norms, we used the Krupka & Weber (2013) instrument and asked participants whether it is socially appropriate for women to be the first mover on a five-point Likert scale (highly inappropriate to highly appropriate). Again, we asked the equivalent question in relation to the role choice of men. In both cases the questions were ordered randomly. Participants could earn £1 if their guess was the same as the modal response. The difference between the descriptive and the injunctive gender norm is that while the latter asks about how men and women should act (an ideal) the former provides an understanding about how participants expect men and women to really act.

In addition to the norm, we also explore other factors that may lead to the reluctance to move first. Inequality aversion has often been used to explain off-equilibrium behavior (Fehr & Schmidt, 1999), and research suggests that women are more equalitarian than men on average (Andreoni & Vesterlund, 2001). While we demonstrate that prosocial concerns theoretically cannot explain the choice to be the responder in Appendices C and D, we also test

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Moreover, they were not aware of their role assignment while making decisions in the sequential bargaining game. Hence, their role choice could not influence their decisions throughout the game.

this empirically. To measure participant's expectations about the fairness of first movers, we asked them to guess the percentage of first movers that offered £5 (£4.50). Participants could earn £1 if their guess was correct within a 10% range based on the outcome in phase 1.

Another potential reason for not choosing to be the first mover is that subjects fail to see the first-mover advantage. To measure participants' understanding of the first-mover advantage, we asked them which role earned more money on average. The available options were: (i) first mover, (ii) responder, and (iii) first mover and responder both earned the same amount. If they answered the question correctly, they received £1.

Lastly, gender differences in risk preferences have been widely observed and have been used to explain differences in decision making across genders (e.g., Eckel & Grossman, 2008). In Appendix E, we show that risk aversion cannot explain the choice to be the responder. Nevertheless, we test this empirically. In task 3, participants completed the Gneezy & Potters (1997) risk elicitation task where they could invest up to £3.

Phase 1 ended with task 4 where participants completed a demographics survey which measured their personality traits (Big 5), age, gender, race, income, political affiliation, and education.[6]

The tasks were programmed in Qualtrics and conducted with participants registered on the online survey platform Prolific in March 2022. Following the standard for online experiments, we restricted participation to individuals with an approval rating of at least 95% in their previously completed tasks to improve data quality. We also pre-screened the Prolific population by participant gender to obtain a gender-balanced sample. Phase 1 was advertised as a 15-minute survey. Participants were compensated with a fixed payment of £2 for completion.

To provide incentives for the questions in task 1, task 2, and task 3, one in ten participants were selected through a lottery.[7] For the selected participants, either task 1, task 2, or task 3 was randomly selected and the participants received their earnings in the selected task, ranging from £0 to £9 based on their performance. Based on our power analysis, our aim was to conduct the phase 1 survey with 300 participants.[8] Participants were excluded if they failed to answer our comprehension questions correctly (6%), or if they did not complete the survey, or where participant gender was not identifiable (< 1%).

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[6] The ten items used to measure the Big 5 personality traits were taken from Rammstedt & John (2007).
[7] This compensation method is effective in incentivizing behavior and is supported by Baillon et al. (2020), Bardsley et al. (2010), Cubitt et al. (1998), and Starmer & Sugden (1991).
[8] The power analysis can be viewed in the pre-registration document ("Who wants to move first?").

One concern with the data obtained in task 2 is that participants might be biased in their responses due to their previous decisions in the sequential bargaining game (i.e., the false consensus effect, Ross et al., 1977). To address this concern, we implemented phase 2 of Study 1: a follow-up incentivized survey where participants did not play the sequential bargaining game. In this survey, we provided participants instructions for the sequential bargaining game played by the participants in phase 1. Subsequently, they answer the questions outlined in task 2 in relation to the data we collected in phase 1. They were also asked to respond to the same set of demographics questions outlined previously. We asked the participants to answer all the questions included in task 2 in phase 1 such as the perception of the fairness of first movers, understanding of the first-mover advantage, and beliefs about injunctive and descriptive norms. As such, these data allow us to examine whether the potential false consensus effect may influence the answers given by participants in phase 1.

We conducted phase 2 on Prolific using the same procedure as in phase 1. It was advertised as a 10-minute survey. Participants were compensated with a fixed payment for completion of £1.50. In addition, 1 in 10 participants were selected through a lottery for a bonus payment ranging from £0 to £6 based on the number of correct answers they gave in the belief elicitation task. Based on our power analysis, our aim was to conduct the phase 2 survey with 100 participants. Like in phase 1, participants were excluded if they failed to answer the comprehension questions correctly (3%).

2.4. Results

Our final sample for phase 1 of Study 1 consists of 298 participants. Table 1 provides a summary of the socio-demographic characteristics of the participant pool in phase 1 (males and females displayed separately). Aside from income and neuroticism, we did not observe significant gender differences in any other characteristics. We control for income and neuroticism in our analysis.

Our sample is slightly younger, better educated, and similar in terms of race and household income relative to the wider UK population (see Table A.1 in the Appendix).

Table 1: Descriptive statistics of the subject pool in phases 1 and 2 of Study 1, and Study 2 by participant gender

	Male			Female		
	Study 1 – phase 1	Study 1 – phase 2	Study 2	Study 1 – phase 1	Study 1 – phase 2	Study 2
Age	44.10	44.39	40.31**	42.53	42.46	39.96*
Asian	0.05	0.04	0.14**	0.05	0.04	0.05
White	0.89	0.94	0.81*	0.89	0.83	0.85
Black	0.03	0.00	0.02	0.05	0.00	0.04
Mixed	0.02	0.02	0.02	0.01	0.13***	0.03
Income	2.27	2.20	1.93***	1.91	2.17	1.72*
Education	3.79	3.67	3.72	3.75	3.88	3.70
Conservative	0.20	0.14	0.14	0.16	0.19	0.08**
Labour	0.38	0.39	0.43	0.44	0.35	0.43
Liberal	0.11	0.16	0.05**	0.09	0.08	0.08
Extraversion	5.28	5.14	5.11	5.36	5.79	5.33
Agreeableness	6.89	6.92	6.83	6.93	6.88	6.76
Conscientiousness	7.64	7.73	7.16**	7.68	8.04	7.35*
Neuroticism	5.36	5.16	5.69	6.71	6.60	6.70
Openness	6.99	6.88	7.02	7.11	7.44	7.23
Observations	148	49	167	150	48	159

Notes: Mean values displayed in each cell. Comparisons are made between each sample and phase 1 of Study 1 for each gender separately. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

2.4.1. Decision to be the responder

We start our analysis by investigating participants' propensities to move first as well as testing our hypothesis of gender differences in role choice.

Supporting Hypothesis 1, we observe a significant reluctance to move first in Study 1. Despite a built-in first-mover advantage, 39.9% of participants chose to be responders (95% CI: [34.3%, 45.7%]). Supporting Hypothesis 2, women were 17.6% more likely to choose to be responders as compared to men (48.7% versus 31.1%, two-sided Fisher's exact test: p-value = 0.002).

To test the robustness of the gender difference, we conducted a multivariate OLS regression analysis of the decision to be the responder.[9] Table 2 reports the results. In column (1), we only include gender (*Female*) as an explanatory variable. The coefficient estimate for the *Female* dummy is positive and statistically significant (p-value = 0.002). In column (2),

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[9] We chose to present the results from OLS estimations for ease of interpretation. The main results are qualitatively the same when we run logit estimations.

we can see that the coefficient estimate remains qualitatively the same even after controlling for the participants' socio-demographic characteristics.[10]

Table 2: Examining gender differences in role choice

	(1)	(2)
Female	0.176***	0.179***
	(0.056)	(0.057)
Constant	0.311***	0.263
	(0.038)	(0.216)
Controls	No	Yes
Observations	298	298

Notes: The dependent variable, Responder, is equal to one if a participant chose to be the responder, and zero otherwise. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We did not observe gender differences in any of the other decisions (i.e., offers and responses to offers) in the sequential bargaining game (see Table A.4 in the Appendix for details). This indicates there are no gender differences in how individuals make decisions within each role, only gender differences in the preference for the role.

Overall, consistent with our hypotheses, we find evidence for a reluctance to move first, and importantly, women are more reluctant than men to move first in the sequential bargaining game.

2.4.2. Is there a gender norm relating to moving first?

We believe that the gender norm against women moving first leads to the gender difference in the willingness to move first. The data collected in task 2 allow us to empirically examine the presence of gender norms based on the beliefs elicited from the participants.

Our data indicates the presence of a descriptive gender norm to move first (see Table 3). Participants in our sample (irrespective of gender) believed that 72.8% of men and 56.6% of women chose to move first (paired t-test: p-value < 0.001). Moreover, we find evidence of the presence of an injunctive gender norm, whereby participants (irrespective of gender) believed that it was more socially acceptable for men to move first than women (4.1 versus 3.9, paired t-test: p-value $= 0.002$).

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[10] Table A.3 in the Appendix shows the coefficients on each of the control variables.

Data from phase 2 of Study 1 further show that the observed descriptive gender norm cannot be attributed to the false consensus effect.[11] As in phase 1, we observe a strong descriptive gender norm. Men believed that 71.5% of men chose to move first and only 57.4% of women chose to move first (paired t-test: p-value < 0.001). Similarly, women believed that 79.3% of men chose to move first and only 58.2% of women chose to move first (paired t-test: p-value < 0.001). These findings provide robust evidence for the descriptive gender norm. Different from phase 1, though, we did not find a gender difference in injunctive gender norms (4.0 versus 4.0, paired t-test: p-value $= 0.6497$).

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[11] Subjects in phase 2 do not differ from those in phase 1 of Study 1 substantively in terms of their socio-demographic characteristics (Table 1). We only observe a higher proportion of mixed-race female participants taking part in phase 2.

Table 3: Comparing responses to tasks 2 and 3 by gender across phases 1 and 2 of Study 1

	Study 1 – phase 1		Study 1 – phase 2	
	Male	Female	Male	Female
Fairness of first mover	62.3%	60.9%	57.0%	54.1%
Percentage that thought moving first was advantageous	61.5%	50.7%*	65.3%	62.5%
Descriptive beliefs about men	72.2%	73.4%	71.5%	79.3%**
Descriptive beliefs about women	58.8%	54.4%*	57.4%	58.2%
Injunctive beliefs about men (scores between 1 and 5)	4.1	4.1	3.9	4.0
Injunctive beliefs about women (scores between 1 and 5)	3.9	4.0	3.9	4.1
Risk (scores between 0 and 3)	1.9	1.9	--	--
Observations	148	150	49	48

Notes: Mean values displayed in each cell. Comparisons are made between genders for each sample separately. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Overall, the results from phase 1 and phase 2 in Study 1 provide substantiating evidence of a descriptive gender norm where people think women are significantly less likely to choose the first mover role than men. At the same time, we do not find strong evidence for an injunctive gender norm in terms of whether women, more than men, should take the second mover role.

2.4.3. Is the reluctance of women to move first driven by gender norms?

Next, we examine whether the descriptive gender norm documented previously can explain the observed gender difference in the willingness to choose to move first.

To do so, we ran an OLS model where the dependent variable *Responder* is equal to 1 if the participant chose to be the responder, and 0 otherwise. Our main independent variables

of interest are the descriptive and the injunctive gender norms. These variables were coded such that they relate to an individual's belief about the behavior of their own gender. For example, if a woman believed the proportion of women that chose to move first was 50%, the value of the descriptive norm variable would be 0.5 for that individual. All specifications include socio-demographics characteristics as control variables.

Column (1) in Table 4 shows a negative and statistically significant coefficient for descriptive gender norms (*Descriptive norm*). Importantly, the estimate of the coefficient for the *Female* dummy decreases and is no longer statistically significant. This suggests that the descriptive gender norm explains the gender gap in being the responder.

In column (2), we control for beliefs about injunctive gender norms (*Injunctive norm*). The coefficient is close to zero and statistically insignificant. At the same time, the coefficient for the *Female* dummy remains large and statistically significant. Hence, the injunctive gender norm is not related to the gender gap in role choice. This is consistent with previous research (e.g., Bicchieri & Xiao, 2009) which has shown how behavior tends to be more aligned with descriptive norms rather than injunctive norms.

Table 4: Examining gender differences in role choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	0.044	0.178***	0.180***	0.179***	0.176***	0.152**	0.002
	(0.062)	(0.057)	(0.057)	(0.057)	(0.057)	(0.059)	(0.063)
Descriptive norm	-0.744***						-0.816***
(% first mover)	(0.152)						(0.151)
Injunctive norm		-0.006					0.011
		(0.030)					(0.029)
Fairness			0.001				0.001
			(0.001)				(0.001)
Risk				-0.003			-0.019
				(0.033)			(0.032)
Understanding					-0.029		-0.041
					(0.058)		(0.058)
Constant	0.818***	0.288	0.221	0.269	0.286	0.228	0.827**
	(0.249)	(0.249)	(0.232)	(0.232)	(0.223)	(0.318)	(0.381)
Big Five	No	No	No	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	298	298	298	298	298	298	298

Notes: The dependent variable, Responder, is equal to one if a participant chose to be the responder, and zero otherwise. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

2.4.4. Is the reluctance of women to move first driven by other factors?

The data collected in tasks 3, and 4 also allow us to empirically examine other potential explanations documented in the literature including beliefs about the fairness of first movers (*Fairness*), risk preferences (*Risk*), understanding of the first-mover advantage (*Understanding*), and the Big 5 personality traits. We code a dummy variable *Fairness* which is equal to one if participants believe that other participants will offer £5 (rather than £4.50) as first movers in the sequential bargaining game in an incentivized survey question, and zero otherwise. *Risk* is a continuous variable ranging from 0 to 3 and is the amount (in pounds) participants were willing to invest in the risk elicitation task. A higher value represents a greater level of risk tolerance. *Understanding* is a dummy variable that is equal to one if the participant indicated that moving first is advantageous, and zero otherwise. We include the scores (ranging from 2 to 10) associated with each of the Big 5 personality traits as discrete values in the regressions.

In Table 4, columns (3) to (6), we include each factor separately together with controls for socio-demographic characteristics. We can see across these columns that none of the factors are statistically significant. Importantly, the coefficient of the *Female* dummy remains significantly positive in all specifications (p-values < 0.05).

In particular with respect to the understanding of the first-mover advantage, our data indicates that more men than women recognize there is a first-mover advantage in the game (61.5% versus 50.7%, two-sided Fisher's exact test: p-value $= 0.063$).[12] However, we do not find any evidence to suggest that this gender difference in understanding the first-mover advantage drives the gender difference we observe in choosing to be the responder (Table 4, column (5)). To further substantiate this result, we restrict our comparison to participants that demonstrated that they understood there was a first-mover advantage (91 males and 76 females) (see Appendix Table A.2 for details). In this subsample we still observe that women choose to be the responder more frequently than men (47.4% versus 28.6%, two-sided Fisher's exact test: p-value $= 0.016$). This is also the case in a multivariate setting (see Appendix Table A.3).

In terms of the Big 5 personality traits, we found that women were more neurotic than men (6.7 versus 5.4, two-sided t-test: p-value < 0.001). However, we do not find any evidence that the difference in this personality trait explains the gender difference in role choice (Table 4, column (6)).

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[12] Participants answered that first movers will earn more money in the game in our incentivized survey question.

Last, we simultaneously control for all factors in the same regression specification in Table 4 column (7). The coefficient estimate for *Descriptive norm* remains negative and statistically significant (p-values < 0.001) while the *Female* dummy is indistinguishable from zero.[13] This implies that participants were more likely to choose to be the responder if they had lower beliefs about the propensity of other participants of their own gender to move first. We also conducted estimations where the descriptive and injunctive norm variables were coded such that they instead measured the difference in an individual's belief about the behavior of men and women (these variables measure relative norms). After doing so, we still find that the role choice is highly correlated with the relative descriptive norm variable and not correlated with the relative injunctive norm variable.

Overall, the results in this subsection suggest there is a strong correlation between the likelihood that an individual chooses to move first and beliefs about descriptive gender norms. Alternative explanations for women's reluctance to move first including a lack of understanding of the first-mover advantage (i.e., lower depth of strategic reasoning), fairness concerns, or differences in risk preferences are not supported by our data. These findings are consistent with the hypothesis that women incur a relatively higher psychological cost of moving first (i.e., strong first-mover aversion) than men.

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[13] We ran the regression in column 1 of Table 4 for each gender separately and found that the descriptive norm variable had a positive effect on the likelihood of choosing to move first for both men and women (p-values $<$ 0.05). The coefficient values indicate that women were more affected by their beliefs about the behavior of women than men were by their beliefs about the behavior of men (-0.934 versus -0.575).

2.4.5. The cost of not moving first

There is strong evidence of higher payoffs for first movers in negotiations (Galinsky & Mussweiler, 2001; Gunia et al., 2013; Ochs & Roth, 1989; Yukl, 1974). We investigate to what extent participants benefited from a higher payoff as a result of moving first in our setting. Our use of the strategy method allows us to obtain information about participants' decisions across all contingencies. This enabled us to calculate the probability of each outcome occurring on average for participant i based on the decisions made by all other $j \neq i$ participants in our sample. We then calculated the expected payoff of being the first mover and responder for every participant based on these probabilities. For women the expected payoff from being the first mover was significantly higher than the expected payoff from being the responder (£4.99 versus £4.91, paired t-test: p-value < 0.001). The same was true for men (£4.99 versus £4.91, paired t-test: p-value < 0.001). As mentioned previously, the only gender difference in decision making observed in our sequential bargaining setting was in relation to choosing whether to move first. Hence, differences in payoffs across genders in Study 1 can be entirely attributed to gender differences in the proportion that chose to move first.

The 1.6% (£0.08/£4.91) higher expected payoff for first movers is meaningful given that the first mover can extract a maximum surplus of £1 relative to the responder. The average payoff participants obtained from the bargaining game in Study 1 was £4.95. Hence, responders left 1.6% (£0.08/£4.95) in earnings or an equivalent of 28% of a standard deviation of earnings (£0.08/£0.29) on the table by not moving first. Our findings indicate that women move first less frequently than men; so, they forgo these gains more frequently than men and have more to gain than men. As Financial managers, women earn $36,805 less per year than men in the same profession ($72,352 versus $109,157) (U.S. Department of Labor, 2019). If women forgo 1.6% ($1,158) of their annual salary because they do not initiate negotiations (i.e., move first), this would explain 3.1% of the gender wage gap. Over the course of thirty years, women would miss out on $34,740 in income or 48% of their initial salary.

3. Study 2

So far, we have considered only the preference for moving first. To see whether people are willing to incur a cost to avoid moving first, the bargaining game in Study 1 is designed such that the first mover always has the advantage. This also means that we cannot determine whether the relative reluctance to move first and the gender difference in the role choice is due to pure first mover aversion or an aversion to take the advantageous position (Cherry & Deaux,

1978). To shed light on these different sources of the observed behavioral pattern, we conduct Study 2 where moving second, instead of first, is advantageous.

3.1. A sequential bargaining game with a responder advantage

The design and payoff structure for the sequential bargaining game in Study 2 are symmetric to that of Study 1. The first mover makes an offer in stage 1. If the responder rejects the offer, the responder makes an offer in stage 2. The main difference in Study 2 is that the asset's value does not depreciate from stage 1 to stage 2 (i.e., its value is still £10), and consequently, the offer space for the responder in stage 2 is the same as the offer space for the first mover in stage 1 (i.e., either £4.50 or £5). As in Study 1, if the first mover rejects the responder's offer in stage 2, both players receive £3.50 at the end. Appendix B provides a detailed description of the experimental design and game structure.

The Subgame Perfect Equilibria of the game (in pure strategies) outlined in Study 2 are as follows:

Stage 0: Role choice = Responder, for both players.
Stage 1: (Offer, Response) = (£4.50, Reject) or (£5, Reject).
Stage 2:

$$\text{Counteroffer} = £4.50,$$

$$\text{Response} = \text{Accept either offer}.$$

The equilibrium payoff for the first mover is £4.50 which is less than the equilibrium payoff for the responder £5.50. According to the equilibrium outlined above, a payoff-maximizing player should always choose to be the responder. We provide a detailed derivation of this equilibrium in Appendix B.

In Appendices C, D, and E we also demonstrate that other potential behavioral factors such as prosocial preferences (e.g., altruism and inequality aversion) and risk preferences cannot lead one to prefer to be the first mover instead of the responder.

3.2. Are the findings in Study 1 driven by advantageous position aversion?

Let us consider the possibility that the psychological cost associated with the role is related to whether the position is advantageous. To differentiate this cost from the cost of moving first

per se, let a be the psychological cost associated with taking the advantageous position. We define an advantageous position averse agent as those whose $a > 0$. A rational agent whose $a = 0$ should take the first mover position in Study 1 and the responder position in Study 2. We do not consider those with $a < 0$ because they would be advantageous position loving which is in the same spirit as a rational agent who maximizes their payoff. Below we show under what conditions an advantageous position averse agent will act differently to a rational agent i.e., choose to be the responder in Study 1 and the first mover in Study 2. We assume agents who are indifferent between the two roles after considering the psychological cost will choose to take the payoff-maximizing role.

Without loss of generality suppose player 2 chooses to be the responder. By adapting the solution stated in subsection 2.2 we know that player 1 will also choose to be the responder in Study 1 if the following holds:

$$U_{FM} - U_R = 5.5 - a - (0.5(5.5 - a) + 0.5 \cdot 4.5) < 0$$

Therefore, if $a > 1$, agents will choose to be the responder in Study 1. By the same logic, if $a > 1$, agents will choose to be the first mover in Study 2.

Thus, we have the following types.

Strong advantageous position averse agents whose $a > 1$ will choose to be the responder in Study 1 and the first mover in Study 2.

Weak advantageous position averse agents whose $0 < a < 1$ will choose to be the first mover in Study 1 and responder in Study 2.

Rational agents whose $a = 0$ will choose to be the first mover in Study 1 and responder in Study 2.

If the participants across our two studies exhibit strong advantageous position aversion, and women do so more often than men, we should find support for the following hypotheses.

Hypothesis 3: *The proportion of participants that choose to be the first mover in Study 2 will be equal to the proportion of participants that chose to be the responder in Study 1.*

Hypothesis 4: *Women will choose to move first more often than men in Study 2.*

Table 1 and Appendix Table A.1 provide information about the sample of participants in Study 2. Compared to those in phase 1 of Study 1, men in Study 2 were younger, less conscientious, had lower incomes, fewer supported the Liberal party, a larger proportion were Asian, and a smaller proportion were White. Women in Study 2 were younger, less conscientious, had lower incomes, and fewer supported the Conservative party than in phase 1 of Study 1. We control for the factors where we identified differences across samples in our analysis.[14] Table A.5 in the Appendix provides descriptive statistics for all decisions made by the participants of Study 2 in the sequential bargaining game.

Inconsistent with Hypothesis 3, we find that the proportion that chose to be the first mover in Study 2 was significantly higher than the proportion that chose to be the responder in phase 1 of Study 1 (57.4% versus 39.9%, two-sided Fisher's exact test: p-value < 0.001). However, when we restrict our sample to those who demonstrated that they understood there was a first-mover advantage in Study 1, and a responder advantage in Study 2 we find no significant difference in the proportion that took the advantageous position across both studies (36.8% versus 37.1%, two-sided Fisher's exact test: p-value = 1.000) (see Table A.2 in the Appendix for details). Hence, we find some support for Hypothesis 3.

In terms of gender differences, we find no evidence supporting Hypothesis 4. Women did not choose to move first more often than men in Study 2 (53.5% versus 61.1%, two-sided Fisher's exact test: p-value = 0.180). This is also the case when we restrict the sample to those who demonstrated they understood there was a responder advantage in Study 2 (40.0% versus 33.3%, two-sided Fisher's exact test: p-value = 0.784). Interestingly, most men (61.1%) chose to move first in Study 2 even though it was not advantageous (95% CI: [53.2%, 68.5%]). However, the same cannot be said for women.

The descriptive gender norm identified in Study 1 also prevailed in Study 2. Participants believed men would choose to move first more often than women, irrespective of their own gender (66.9% versus 51.7%, two-sided t test: p-value < 0.001) (see Table A.6 in the

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[14] We control for these differences through regression analysis and find that the results reported in this subsection are robust to the inclusion of these factors.

Appendix). This shows that the gender norm is about moving first rather than taking an advantageous position. Given the lack of support for Hypothesis 4 and our findings in relation to descriptive gender norms across both studies 1 and 2, we conclude that our results are due to women being first-mover averse rather than advantageous position averse.

4. Conclusion

Moving first is often advantageous in a variety of settings e.g., bargaining or market entry. Whether an individual adopts the first mover position can be determined by one's role preference. We report the first experimental evidence for the reluctance to move first despite the presence of a monetary first-mover advantage. Importantly, we show that women chose to move first less frequently than men. Our data allows us to investigate different mechanisms for why women lack the inclination to move first, and our findings suggest that this is due to descriptive gender norms, not injunctive gender norms. Moreover, our results are consistent with women having an aversion to move first rather than being averse to taking the advantageous position.

The reluctance to move first can be a source of gender-based inequality. Our findings have direct implications for interventions that encourage women to take initiative in settings where moving first is advantageous. Our data suggests the presence of a descriptive gender norm that women do not believe that their female peers would choose to move first. On the other hand, we do not observe an injunctive gender norm with respect to role choice. The suggestions for policy would differ depending on which norm is observed to operate in this context. As people believe it is equally socially acceptable for men and women to move first, the norm that needs policy intervention is the descriptive norm. Thus, policies that focus on changing the perception of how female peers behave can be potentially beneficial in encouraging more women to move first. This may be achieved, for instance, through exposure to role models or by defaulting women into moving first (Koenig et al., 2011).

The sequential bargaining setting described in this paper can be extended in several ways. In our setup we imposed a discretized strategy space for ease of implementation. Although, in many situations the strategy space for offers in a bargaining game is continuous. It would be worthwhile studying how changing the strategy space in the game determines the preferences over roles in the sequential bargaining game. Exploring preferences over moving first in other domains where it is advantageous (e.g., market entry or work groups) could also be an interesting direction for future research.

Previous research on gender inequality suggests that gender norms and economic decisions may vary across cultures (Moreau et al., 2021). An interesting avenue for future research would be to examine whether role preferences vary across cultures and to what extent they may contribute to the differing degrees of gender inequality observed across cultures.

The psychological literature has provided evidence of a link between stronger masculinity norms and men's occupational choices (Cross & Bagilhole, 2002), mental health outcomes (Mahalik & Rochlen, 2006; Wong et al., 2017), and aggressive behavior (Bosson et al., 2009; Cheryan et al., 2015; Reidy et al., 2009). In the field of economics, Baranov et al. (2023) analyzed the impact of male norms, finding that locations with stronger male norms are associated with more violence and suicide among men. Although not a primary focus of our research, we provide evidence of a direct link between male norms and economic outcomes. Our findings reveal that most men prefer to move first, even when it is not monetarily beneficial. This behavior can be explained by the presence of a gender norm for men to move first. Many real-life contexts are designed to align with male gender norms (Eagly, 1983). Our results demonstrate that men may be at a disadvantage when the advantageous position does not naturally align with male gender norms. We encourage further investigation into this gender-based disadvantage.

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Appendix

A. Tables

Table A.1: Comparison of demographics of sample participant pool to the UK population

	Study 1 – phase 1	Study 1 – phase 2	Study 2	UK population
Age				
18-34	33.6%	26.8%	40.2%	29.0%
35-54	43.0%	49.5%	42.6%	35.2%
55-69	21.5%	21.6%	15.0%	20.9%
>70	2.0%	2.1%	2.1%	14.8%
Race				
Asian	5.4%	4.1%	9.5%	7.5%
White	88.9%	88.6%	83.1%	86.0%
Black	3.7%	0%	2.8%	3.3%
Mixed	1.3%	7.2%	2.5%	2.2%
Other	0.3%	0%	1.2%	1.0%
Prefer not to say	0.3%	0%	1.0%	
Income				
< £20,000	27.5%	26.8%	43.9%	25.8%
£20,000 - £39,999	48.0%	45.4%	37.4%	44.2%
£40,000 - £59,999	14.4%	14.4%	12.9%	19.3%
£60,000 - £79,999	8.1%	9.3%	4.0%	6.1%
> £80,000	2.0%	4.1%	1.8%	0.4%
Highest level of education				
Primary	0.7%	0%	0%	18.3%
High school	34.9%	36.1%	43.6%	31.6%
Undergraduate degree	51.0%	50.5%	40.5%	35.2%
Postgraduate degree	13.4%	13.4%	15.6%	14.9%
Observations	298	97	326	

Data sources: OECD and UK census 2011. Household income is based on 2020 data published by the UK Office for National Statistics.

Table A.2: Role choices for those who correctly indicated which role was advantageous

	Study 1 – phase 1			Study 2		
	Male	Female	Both genders	Male	Female	Both genders
Prop. chose first mover	0.714 (0.454)	0.526** (0.503)	0.629 (0.485)	0.333 (0.480)	0.400 (0.498)	0.368 (0.487)
Prop. chose responder	0.286 (0.454)	0.474** (0.503)	0.371 (0.485)	0.667 (0.480)	0.600 (0.498)	0.632 (0.487)
Observations	91	76	167	27	30	57

Notes: Mean values displayed in each cell. Comparisons are made between genders for each decision within a study. Standard deviations are displayed in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.3: Multivariate OLS regression analysis of the decision to be the responder in Study 1

	Whole sample	Those who knew of the first-mover advantage
Female	0.179***	0.191**
	(0.057)	(0.073)
Age	-0.000	0.004
	(0.002)	(0.003)
Black	-0.252**	0.073
	(0.127)	(0,176)
Asian	0.137	0.307
	(0.139)	(0.253)
Mixed	0.123	0.154
	(0.279)	(0.317)
Income	0.029	0.043
	(0.032)	(0.041)
Education	-0.024	-0.062
	(0.046)	(0.063)
Labour	0.181**	0.249**
	(0.080)	(0.103)
Liberal	0.107	0.226
	(0.113)	(0.154)
Constant	0.263	0.129
	(0.216)	(0.291)
Observations	298	167

Notes: The dependent variable, Responder, is equal to one if a participant chose to be the responder, and zero otherwise. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.4: Decisions made in the sequential bargaining game in phase 1 of Study 1 by participant gender

Stage	Active role	Decision	Male	Female
0	N/A	Chose to be the responder	31.1% (N = 148)	48.7%*** (N = 150)
1	First mover	Offered £5	87.8% (N = 148)	86.7% (N = 150)
1	Responder	Accepted offer of £4.50	70.9% (N = 148)	69.3% (N = 150)
1	Responder	Accepted offer of £5	99.3% (N = 148)	99.3% (N = 150)
2	Responder	Offered £4 if rejected offer of £4.50	72.1% (N = 43)	71.7% (N =46)
2	Responder	Offered £4 if rejected offer of £5	100.0% (N = 1)	0.0% (N = 1)
2	First mover	Accepted offer of £3 if offer of £4.50 was rejected	22.2% (N = 18)	35.0% (N = 20)
2	First mover	Accepted offer of £4 if offer of £4.50 was rejected	77.8% (N = 18)	85.0% (N = 20)
2	First mover	Accepted offer of £3 if offer of £5 was rejected	19.2% (N = 130)	26.9% (N = 130)
2	First mover	Accepted offer of £4 if offer of £5 was rejected	85.4% (N = 130)	86.2% (N = 130)

Notes: Mean values displayed in each cell. Comparisons are made between genders for each decision. The number of observations is displayed in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Decisions made in the sequential bargaining game in Study 2 by participant gender

Stage	Active role	Decision	Male	Female
0	N/A	Chose to be the responder	38.9% (N = 167)	46.5% (N = 159)
1	First mover	Offered £5	85.6% (N = 167)	89.3% (N = 159)
1	Responder	Accepted offer of £4.50	48.5% (N = 167)	50.3% (N = 159)
1	Responder	Accepted offer of £5	98.2% (N = 167)	97.5% (N = 159)
2	Responder	Offered £5 if rejected offer of £4.50	74.4% (N = 86)	79.7% (N =79)
2	Responder	Offered £5 if rejected offer of £5	0.0% (N = 3)	50.0% (N = 4)
2	First mover	Accepted offer of £4.50 if offer of £4.50 was rejected	50.0% (N = 24)	82.4%* (N = 17)
2	First mover	Accepted offer of £5 if offer of £4.50 was rejected	87.5% (N = 24)	94.1% (N = 17)
2	First mover	Accepted offer of £4.50 if offer of £5 was rejected	67.8% (N = 143)	73.2% (N = 142)
2	First mover	Accepted offer of £5 if offer of £5 was rejected	95.8% (N = 143)	96.5% (N = 142)

Notes: Mean values displayed in each cell. Comparisons are made between genders for each decision. The number of observations is displayed in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.6: Comparing responses to tasks 2 and 3 by gender in Study 2

	Male	Female
Fairness of first mover	76.6%	83.6%
Percentage that thought moving first was advantageous	43.1%	32.7%*
Descriptive beliefs about men	66.0%	67.9%
Descriptive beliefs about women	53.3%	50.0%
Injunctive beliefs about men (scores between 1 and 5)	4.0	4.2**
Injunctive beliefs about women (scores between 1 and 5)	3.9	4.1
Risk (scores between 0 and 3)	2.0	1.9
Observations	167	159

Notes: Mean values displayed in each cell. Comparisons are made between genders for each sample separately. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B. Study 2: sequential bargaining game with a responder advantage

a. Experimental design and procedures

Aside from how we parameterized the sequential bargaining game, the procedures used in Study 2 were the same as Study 1. The tasks were programmed in Qualtrics and conducted with participants registered on the online survey platform Prolific in March 2023. In Study 1 we recruited 148 males and 150 females. To make the two samples comparable we sought to recruit 150 males and 150 females for Study 2.[15] Participants were excluded if they failed to answer our comprehension questions correctly ($<1\%$), or if they did not complete the survey, or where participant gender was not identifiable ($<1\%$).

Like the game described in Study 1, in this game, two players must determine how to divide an asset. The game consists of three decision stages.

Stage 0

In stage 0 each player simultaneously chooses whether to be the first mover or the responder. If players select different roles, then each player is assigned to the role they chose. If players select the same role, then roles are randomly assigned.

Stage 1

In stage 1, the asset is worth £10. The first mover must offer either £4.50 or £5 to the responder. If the responder accepts, the first mover receives £10 minus the number of pounds offered, and the responder receives the number of pounds offered. If the responder rejects, the game moves to stage 2.

Stage 2

In stage 2 the asset is worth £10. The responder must offer either £4.50 or £5 to the first mover. If the first mover accepts, the first mover receives the number of pounds offered, and the responder receives £10 minus the number of pounds offered. If the first mover rejects, both players receive £3.50.

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[15] Both studies were pre-registered at the Open Science Framework (OSF), "Who wants to move first?" The power analyses can be viewed in the pre-registration documents.
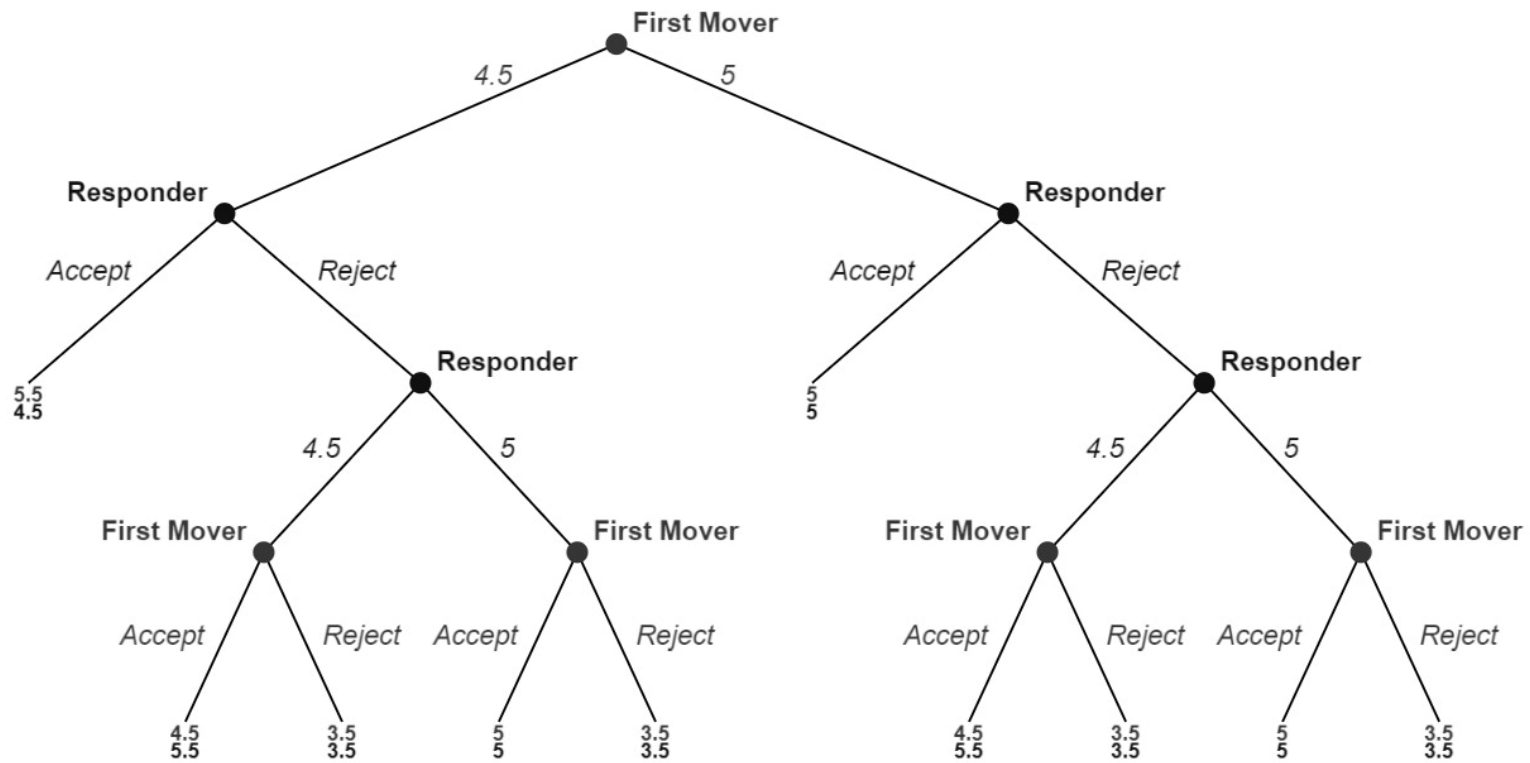
Figure B.1: Game structure after role assignment in Study

b. Equilibrium for the sequential bargaining game

Since the game consists of multiple stages, using standard economic theory, our equilibrium concept is that of a Subgame Perfect Equilibrium. We begin by deriving the best response for each player in stage 2, then stage 1, and finally stage 0.

Stage 2

Given the first mover receives £3.50 if they reject the responder's offer, the first mover will accept whatever offer is made by the responder as offers of £4.50 and £5 are greater than £3.50. Expecting such a response from the first mover, the responder will offer £4.50 to the first mover as otherwise they receive only £5.

Stage 1

The responder will reject both offers of £4.50 and £5 as these amounts are less than £5.50, the amount they will receive in stage 2 if they reject the offer in stage 1. Given this, the first mover will offer either £4.50 or £5 to the responder as their offer is inconsequential.

Stage 0

Given the above analysis of stage 1 and stage 2, both players will choose to be the **responder**. In this case, one of them will be randomly selected to be the responder and the expected payoff $= 0.5 \cdot £5.50 + 0.5 \cdot £4.50 = £5$, which is greater than the payoff of choosing to be the first mover (£4.50).

C. What if players are altruistic?

In this section we adopt a similar approach to Bester & Güth (1998).[16] Assume both players have altruistic preferences captured by $\alpha \in (0, 1)$. For simplicity we assume these altruistic preferences are common knowledge. The utility for player $i, j \in \{1, 2\}$ and $i \neq j$ is as follows:

$$U_i = x_i + \alpha x_j,$$

where x_i is the payoff in £ for player i.

Study 1: sequential bargaining with a first-mover advantage

Stage 2

The first mover will **accept** an offer of £4 as their payoff will be $4 + 4\alpha > 3.5 + 3.5\alpha$. The first mover will **reject** an offer of £3 if $\alpha < \frac{1}{3}$ as their payoff will be $3 + 5\alpha < 3.5 + 3.5\alpha$. Otherwise, the first mover will **accept** an offer of £3 if $\alpha \geq \frac{1}{3}$. The responder will offer **£4** to the first mover if $\alpha < \frac{1}{3}$ as their payoff will be $4 + 4\alpha > 3.5 + 3.5\alpha$. The responder will offer **£3** to the first mover if $\alpha \geq \frac{1}{3}$ as their payoff will be $5 + 3\alpha > 4 + 4\alpha$.

Stage 1

If $\alpha < \frac{1}{3}$ the responder will **accept** an offer of £4.50 as their payoff will be $4.5 + 5.5\alpha > 4 + 4\alpha$. If $\alpha \geq \frac{1}{3}$ the responder will **accept** an offer of £4.50 as their payoff will be $4.5 + 5.5\alpha > 5 + 3\alpha$. If $\alpha < \frac{1}{3}$ the responder will **accept** an offer of £5 as their payoff will be $5 + 5\alpha > 4 + 4\alpha$. If $\alpha \geq \frac{1}{3}$ the responder will **accept** an offer of £5 as their payoff will be $5 + 5\alpha > 5 + 3\alpha$. The first mover will offer **£4.50** to the responder as their payoff will be $5.5 + 4.5\alpha > 5 + 5\alpha$.

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[16] In Bester & Güth (1998) players care more about their own material payoffs than about other players, i.e., $\alpha < 1$. We maintain this assumption.

The utility for player 1 if they are the first mover U_1^{FM} and responder U_1^R in the equilibrium if is as follows:

$$U_1^{FM} = 5.5 + 4.5\alpha$$

$$U_1^R = 4.5 + 5.5\alpha$$

Suppose player 2 chooses to be the responder. The difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 5.5 + 4.5\alpha - \big(0.5(5.5 + 4.5\alpha) + 0.5(4.5 + 5.5\alpha)\big) = 0.5 - 0.5\alpha > 0.$$

Therefore, altruistic players should never choose to be the responder.

Study 2: sequential bargaining with a responder advantage

Stage 2

The first mover will **accept** an offer of £4.50 as their payoff will be $4.5 + 5.5\alpha > 3.5 + 3.5\alpha$. The first mover will **accept** an offer of £5 as their payoff will be $5 + 5\alpha > 3.5 + 3.5\alpha$. The responder will offer **£4.50** to the first mover as their payoff will be $5.5 + 4.5\alpha > 5 + 5\alpha$.

Stage 1

The responder will **reject** an offer of £4.50 as their payoff will be $5.5 + 4.5\alpha > 4.5 + 5.5\alpha$. The responder will **reject** an offer of £5 as their payoff will be $5.5 + 4.5\alpha > 5 + 5\alpha$. The first mover is indifferent between offering £4.50 and £5 as their payoff will be $4.5 + 5.5\alpha$ in both cases.

The utility for player 1 if they are the first mover U_1^{FM} and responder U_1^R in the equilibrium if is as follows:

$$U_1^{FM} = 4.5 + 5.5\alpha$$

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$$U_1^R = 5.5 + 4.5\alpha$$

Suppose player 2 chooses to be the first mover. The difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 0.5(4.5 + 5.5\alpha) + 0.5(5.5 + 4.5\alpha) - (5.5 + 4.5\alpha) = 0.5\alpha - 0.5 < 0.$$

Therefore, altruistic players should never choose to be the first mover.

D. What if players are inequality averse?

In this section we adopt the approach taken by Fehr & Schmidt (1999). Without loss of generality assume both players have preferences over inequality captured by $\gamma, \delta \in (0,1)$ and $\gamma \geq \delta$.[17] For simplicity we assume these inequality preferences are common knowledge. The utility for player $i, j \in \{1, 2\}$ and $i \neq j$ is as follows:

$$U_i = x_i - \gamma \max(x_j - x_i, 0) - \delta \max(x_i - x_j, 0).$$

where x_i is the payoff in £ for player i.

Study 1: sequential bargaining with a first-mover advantage

Stage 2

The first mover will **accept** an offer of £4 as their payoff will be $4 > 3.5$. The first mover will **reject** an offer of £3 as their payoff will be $3 - 2\gamma < 3.5$. The responder will offer **£4** to the first mover as their payoff will be $4 > 3.5$.

Stage 1

If $\gamma < 0.5$, the responder will **accept** an offer of £4.50 as their payoff will be $4.5 - \gamma > 4$. If $\gamma \geq 0.5$, the responder will **reject** an offer of £4.50 as their payoff will be $4.5 - \gamma < 4$. For all values of γ the responder will **accept** an offer of £5 as their payoff will be $5 > 4$. If $\gamma < 0.5$ and $\delta < 0.5$, the first mover will offer £4.50 to the responder as their payoff will be $5.5 - \delta > 5$. Otherwise, the first mover will offer £5 to the responder as their payoff will be $5 > 4$.

The utility for player 1 if they are the first mover U_1^{FM} and responder U_1^R in the equilibrium if is as follows:

$$U_1^{FM} = \begin{cases} 5.5 - \delta & \text{if } \gamma < 0.5 \text{ and } \delta < 0.5 \\ 5 & \text{otherwise.} \end{cases}$$

---

[17] The assumption $\gamma \geq \delta$ reflects the tendency people must care more about inequality when they are adversely affected as opposed to when someone else is adversely affected. Our results do not depend on this assumption.

$$U_1^R = \begin{cases} 4.5 - \delta & \text{if } \gamma < 0.5 \text{ and } \delta < 0.5 \\ 5 & \text{otherwise.} \end{cases}$$

Suppose player 2 chooses to be the responder. If $\delta < 0.5$ and $\gamma < 0.5$, the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 5.5 - \delta - \left(0.5(4.5 - \gamma) + 0.5(5.5 - \delta)\right) = 0.5(1 + \gamma - \delta) > 0.$$

If $\delta \geq 0.5$ and/or $\gamma \geq 0.5$, the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 5 - (0.5 \cdot 5 + 0.5 \cdot 5) = 0.$$

Hence, for all possible values of γ and δ inequality averse players are at least as well off (if not better off) choosing to be the first mover.

Study 2: **sequential bargaining with a responder advantage**

Stage 2

The first mover will **accept** an offer of £4.50 as their payoff will be $4.5 - \gamma > 3.5$. The first mover will **accept** an offer of £5 as their payoff will be $5 > 3.5$. The responder will offer **£4.50** to the first mover if $\delta < 0.5$ as their payoff will be $5.5 - \delta > 5$. Otherwise, if $\delta \geq 0.5$, the responder will offer **£5** to the first mover.

Stage 1

If $\delta < 0.5$, the responder will **reject** an offer of £4.50 as their payoff will be $4.5 - \gamma < 5.5 - \delta$. If $\delta \geq 0.5$, the responder will **reject** an offer of £4.50 as their payoff will be $4.5 - \gamma < 5$. If $\delta < 0.5$, the responder will **reject** an offer of £5 as their payoff will be $5 < 5.5 - \delta$. If $\delta \geq 0.5$, the responder is indifferent between accepting and rejecting an offer of £5 as their payoff

will be 5 in both cases. For all values of δ the first mover is indifferent between offering £4.50 and £5 as they will receive the same payoff either way.

The utility for player 1 if they are the first mover U_1^{FM} and responder U_1^R in the equilibrium if is as follows:

$$U_1^{FM} = \begin{cases} 4.5 - \gamma & \text{if } \delta < 0.5 \\ 5 & \text{otherwise.} \end{cases}$$

$$U_1^R = \begin{cases} 5.5 - \delta & \text{if } \delta < 0.5 \\ 5 & \text{otherwise.} \end{cases}$$

Suppose player 2 chooses to be the first mover. If $\delta < 0.5$, the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 0.5(4.5 - \gamma) + 0.5(5.5 - \delta) - (5.5 - \delta) = -0.5(1 + \gamma - \delta) < 0.$$

If $\delta \geq 0.5$, the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

$$U_1^{FM} - U_1^R = 0.5 \cdot 5 + 0.5 \cdot 5 - 5 = 0.$$

Hence, for all possible values of γ and δ inequality averse players are at least as well off (if not better off) choosing to be the responder.

E. What if players are risk averse?

Without loss of generality assume the utility for both players exhibits Constant Relative Risk Aversion (CRRA). The utility for player $i, j \in \{1, 2\}$ and $i \neq j$ is as follows:

$$U_i = \begin{cases} \dfrac{x_i^{1-\lambda}}{1-\lambda} & \text{if } \lambda \neq 1 \\ \ln(x_i) & \text{otherwise.} \end{cases}$$

where x_i is the payoff in £ for player i and $\lambda > 0$.

Study 1: sequential bargaining with a first-mover advantage

Uncertainty is only a factor prior to roles being assigned. Suppose player 2 chooses to be the responder. By adapting our solution in subsection 2.2 the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

If $\lambda \neq 1$:

$$U_1^{FM} - U_1^{R} = \frac{1}{1-\lambda} 5.5^{1-\lambda} - \frac{1}{2(1-\lambda)} \left(5.5^{1-\lambda} + 4.5^{1-\lambda}\right) = \frac{1}{2(1-\lambda)} \left(5.5^{1-\lambda} - 4.5^{1-\lambda}\right) > 0.$$

If $\lambda = 1$:

$$U_1^{FM} - U_1^{R} = \ln(5.5) - 0.5(\ln(5.5) + \ln(4.5)) = 0.5(\ln(5.5) - \ln(4.5)) > 0.$$

Therefore, risk averse players are always better off choosing to be the first mover.

Study 2: sequential bargaining with a responder advantage

Uncertainty is only a factor prior to roles being assigned. Suppose player 2 chooses to be the first mover. By adapting our solution in subsection 2.2 the difference in the payoff for player 1 between choosing to be the first mover and choosing to be the responder is as follows.

If $\lambda \neq 1$:

$$U_1^{FM} - U_1^R = \frac{1}{2(1-\lambda)}\left(5.5^{1-\lambda} + 4.5^{1-\lambda}\right) - \frac{1}{1-\lambda}5.5^{1-\lambda} = \frac{1}{2(1-\lambda)}\left(4.5^{1-\lambda} - 5.5^{1-\lambda}\right) < 0.$$

If $\lambda = 1$:

$$U_1^{FM} - U_1^R = 0.5(\ln(5.5) + \ln(4.5)) - \ln(5.5) = 0.5(\ln(4.5) - \ln(5.5)) < 0.$$

Therefore, risk averse players are always better off choosing to be the responder.