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The effect of wage proposals on efficiency and income distribution☆

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ABSTRACT

Pre-play non-binding communication in organizations is prevalent. We study the implications of pre-play, private and public, wage proposals in labor markets. To that end, we develop a theoretical model from which we derive certain hypothesis that we test through a laboratory experiment. In the baseline, that depicts a typical labor market interaction, the employer makes a wage offer to the worker who may then accept or reject it. In subsequent treatments, workers, moving first, make private, non-binding, wage proposals to the employer. In a following treatment, the proposals are made public. Our findings suggest that both private and public wage proposals promote higher wages, efficiency, and income equality. Public information on wage proposals benefits firms more than workers while, workers benefit more under private proposals where income inequality is the lowest. We find some support in our data on workers conforming to their co-workers' wage proposals when these are public. Finally, the gender gap observed in the baseline on acceptance rates and workers' income vanishes when proposals are present.

1. Introduction

Employers frequently ask workers for their expected wages in negotiations or, workers may instead make wage proposals to their employers. The practice is common in professional sports, senior level management, academic hiring, and many other highly skilled jobs. Proposals can take many forms with one-to-one negotiations to centralized mechanisms such as unions (at the firm, industry or national level) making wage proposals to employers. Despite their widespread use, these forms of wage institutions are poorly understood and little studied.[1]

While there is a large literature dealing with pre-play communication when "talk is cheap" (see Crawford, 1998, for an early review and Blume et al., 2020, for a more recent one), these models have been rarely applied to labor market settings. It is reasonable to expect

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[1] See, Du Caju et al. (2008) for details on different forms of wage bargaining institutions.

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workers conveying their wage expectations to future employees. In this paper, we study pre-play wage proposals (cheap talk) in a laboratory experiment of employment relationships where workers can make a non-binding wage proposal to their employer. Our *baseline* looks at the traditional ex-ante wage posting structure (ultimatum game) where the employer makes wage offers to two workers. Each worker can either accept or reject. On acceptance, full surplus is realised, while zero surplus is obtained in the case of a rejection. We then modify this to allow workers to first make *private* wage proposals that are non-binding for the firm. Firms observe the proposals and can then choose to make an offer that the worker may accept or reject.[2] We also run an additional treatment where we allow for *public* observability of the proposal, at the end of each period.[3]

Our focus is to analyze the effect that different wage proposals have on the outcomes of the employment relationship. By comparing the effects of proposals with the baseline, we can study how pre-play communication affects wages, income distribution and overall efficiency. Our setting allows us to answer the following novel research questions: Are wage offers higher when workers are allowed to make ex-ante proposals? Do proposals increase the probability of accepting wage offers (and hence efficiency)? Who benefits from making wage proposals public information to other workers?

In our experiment, we consider a setting in which workers are informed about other workers' wage proposals. Since our motivating question was to study the role of pre-play communication in worker-employer relationships, it seemed a natural step to then study the effect of revealing these communications. Revealing wage proposals captures casual communications amongst workers. As workers are permitted to discuss wages by law in many countries, it seems reasonable to assume that they share information regarding their experience. We also understand that we could have asked workers to reveal the information voluntarily or the experimenter automatically revealing proposals. We chose the latter, as endogenizing the choice to reveal or not, would have complicated the experimental design further. In short, it might be realistic to consider a setting where wage proposals are public information (people talk before or during the negotiation process) but where wage offers remain secret after the wage offer is awarded because of informal requests from employers to keep it secret.

Our theoretical model is developed to provide us with some testable hypotheses. It relies on the idea that workers' wage proposals are pre-play cheap talk (see Farrell and Rabin, 1996 for a review). Non-binding proposals may convey information about the worker's minimum acceptable wage with workers misreporting their private information with a certain positive probability. As a result, the optimal wage offer by the firm is a function of the workers' wage proposals (which may be "partially" or "fully" revealing to the employer). We show that if we have a mix of "revealing" and "partially revealing" workers then, the final wage offer will be increasing in the proposals as the firm faces a trade-off between the possibility of rejection of low offers and acceptance of higher ones. This simple intuition also sets the stage for our hypotheses. We expect firm's wage offers to be increasing in proposals. This implies that average wage offers under proposals should be greater than in the baseline (with no proposals). We also expect wage proposals to increase acceptance rates, and consequently, efficiency relative to the baseline.

Our experimental results are broadly consistent with our hypotheses. They indicate that introducing proposals prior to firm wage-setting decisions has important efficiency and distributional consequences. We also find that public proposals benefit the firm that earns higher profits, while private proposals are more conducive towards improving workers' wages. Moreover, both type of wage proposals increase income equality among workers. On the other hand, we also find that the baseline without proposals is the most inefficient setting while also leading to the highest levels of income inequality. In a nutshell, our results indicate that while both types of wage proposals lead to higher wages, income equality and efficiency, public information benefits firms more than workers.[4] While this finding runs counter to popular opinion on the effects of wage transparency, it is very much in line with recent field evidence showing that making the outcomes of wage negotiations public reduces individual workers' bargaining power and hence wages (Cullen and Pakzad-Hurson, 2023). We suggest that a possible explanation for this is that, under public information, workers are more willing to conform to the proposals of others and less likely to reject wage offers.

Though not a direct test of wage revelation, our experimental results have interesting implications for policy makers as we find the potential efficiency and distributional consequences of proposals that are a widely used instrument in wage negotiations.

The remainder of the paper is organized as follows. We review the literature in Section 2. We describe the experimental design and procedures in Section 3. We present our theoretical model in Section 4. The main results are reported in Section 5, and we conclude in Section 6.

2. Literature review

To the best of our knowledge, the only paper that analyses (average) wage proposals, in a relationship between firms and workers is

[2] This is the ultimatum game version of the labor market institution where rejection of an offer results in zero surplus to both workers and the firm. We use this structure because most traditional markets are of this nature, where a rejection of an offer from one side results in zero surplus for both. Additionally, it allows us to see the effect of proposals in a clean environment without confounding effects such as effort provision.

[3] Our private and public proposals treatments resemble the design in Rigdon (2012) (demand side) ultimatum game experiment. Rigdon's research goal is to analyze the gender wage gap under private proposals and whether it can be mitigated with public information. Our focus is quite different from hers.

[4] While not our main focus, we also look at gender effects in our experiment (see Section 5.4). Wage proposals could be another avenue for gender wage discrimination if females have lower willingness to accept/propose. We find that making proposals privately (public), tend to increase male (female) wage proposals and hence overall income. Even though these differences are not statistically significant, this pattern of behavior resembles the "catch up" result in Rigdon (2012).

Bottino et al. (2016). They studied the effect of worker entitlement to a wage in a gift exchange game. Their structure resembled that of a workers' union making a non-binding single wage proposal to firms on behalf of a worker's collective. An average non-binding wage proposal is presented to employers from the workers, who then independently respond by making wage offers in a double auction format (à la Fehr et al., 1993). While average wages slightly increase, they find a negative relation between effort and wage expectations. The main difference with our study is that we present worker proposals to firms at an individual level. Additionally, we dont consider effort levels to control for reciprocity effects. Also, while Bottino et al. (2016) use a double auction set-up that has been used in gift exchange experiments, we model a firm-worker relationship where offers are posted and can only be accepted or rejected.

There have been several papers that have looked at communication in ultimatum games. The nature of communication varies. Some have used messages from responders to proposers (Ong et al., 2012; Rigdon, 2012; Rankin, 2003) or to future players (Schotter and Sopher, 2007). Others have used face-to-face (Valley et al., 1998), video (Roth, 1995; Zultan, 2012) or written free form communication. The results vary and only the study by Valley et al. (1998) finds that gains for both sides increase as communication opportunities increase. Most of the papers, however, point towards no (Ong et al., 2012) or a negative (Rankin, 2003; Schotter and Sopher, 2007) effect.

Though not using a similar setup, the closest to ours is Rigdon (2012) who studies proposals in a (demand-side) ultimatum game to study the gender wage gap. She finds that females ask for less and earn smaller amounts than their male counterparts. Similar to the Schotter and Sopher (2007) advice experiments, in Ringdon's framework workers make proposals that are made public in a subsequent treatment. Making proposals public, i.e., proposals being made by others in a similar negotiating situation, directly influence the beliefs women have about proposals in the ultimatum game. Consequently, they ask for more, thus eliminating the negotiation gap and eliminating the gender gap in wages. In contrast to our study, Rigdon (2012) does not study a labor market interaction and uses a Demand Side Ultimatum Game. Additionally, the experiment does not consider a baseline treatment without proposals (since her research goal is quite different to ours) and her framework cannot be used to assess the overall effects of wage proposals.[5] Rankin (2012) used pre-play proposals by responders. He considers a randomly matched ultimatum game where responders make a non-binding pre-set written request and finds a positive relation between requested and offered amounts (as we do). However, requests reduced offers (unlike our case), increased the rate of rejection (unlike our case) and decreased average pay of proposers and responders (unlike our paper where both firms and workers gain under proposals). Further, conditional on the offer, the ability to make requests decreases the probability of rejection. The data also provide evidence that proposers used requests as a "bluff". That is, more than half of the time responders accepted offers that were smaller than their requests. He argues that sending messages may crowd out altruism or fairness concerns, or high requests may result in spiteful offers.

Our paper also relates to the experimental literature on negotiations. Their focus, however, is mostly on the gender gap. Some of them consider the Ultimatum Game (Eckel and Grossman, 2001 and García-Gallego et al., 2012), while others use different versions of negotiation games with several stages (Hernandez-Arenaz and Iriberri, 2018 and Exley et al., 2020). We will provide further details of these studies in the results section where we report our findings on gender.

Cheap talk can be interpreted as the weakest form of worker participation where firms consider workers' communication credible with a certain probability. Our research also adds to the literature on worker involvement in the wage participation process (Charness et al., 2012; Charness et al., 2016; Jeworrek and Mertins, 2014; Franke et al., 2016, among others).[6] Worker participation in the wage determination process occurs in many forms at the workplace. It can be through wage bargaining, centralised or decentralised, or direct participation of workers in the wage process. The latter has been studied in the lab (Charness et al., 2012) and the field (Jeworrek and Mertins, 2014). Other factors that have been studied are social comparison (Charness et al., 2016) or choosing from a menu of options (Franke et al., 2016). The majority of this research, experimental or field, broadly confirms that worker participation increases worker productivity.

A comment is due regarding the experimental methodology and as to whether the behavioural traits identified in the experiment are present or applicable in markets outside the laboratory. While external validity is always an issue in any laboratory (or field) experiment, what is important is that qualitative results guide us in the right direction (see Kessler and Vesterlund, 2015 and Camerer, 2015). There is evidence that many of the behavioural traits observed in the laboratory are observed with high stakes (Cameron, 1999; Slonim and Roth, 1998; Fehr et al., 2002; Jeworrek and Mertins, 2014) or extend to real world situations. Jeworrek and Mertins (2014) find that a managerial policy of allowing employees to self-determine their wages, as had been suggested by laboratory evidence, extends to the field. They find that this policy indeed enhances performance. Güth et al. (2007) compare an Ultimatum Game (UG hereafter) where participants were students and another UG where participants were newspaper's readers and they found that results are similar. Dyer et al. (1989) find that professionals also are subject to the winner's curse. Fairness concerns also play a prominent role in firm's wage policies (Bewley and Bewley, 2009; Agell and Bennmarker, 2003) while recent papers indicate that laboratory measures of social preferences can be good predictors of behavior in field settings. Karlan (2005) shows that reciprocity (i.e., trustworthiness) in trust games predicts subjects' loan repayments one year after a laboratory experiment, and Carpenter and Seki's work (2005) suggests

[5] Yamamori et al. (2008) conducted a dictator game experiment in which the recipient states a request for the minimum offer that they are willing to receive before the dictator dictates the offer, finding that the latter increases as the recipient's request increases to half of the share. Albeit in a quite different setting, their finding is in line with our own result that wage offers tend to increase with workers' proposals.

[6] Charness et al. (2016) argue that social comparison is important in labor markets and may affect one's attitude towards an employer or intrinsic motivation. This is similar to our idea of conformity (Cialdini and Goldstein, 2004), when rival proposals are public, where workers observe proposals of a worker from an earlier period. The only channel through which conformity works in our setup is through adjustment of wage proposals. Our idea of conformity assumes that a worker's proposal will mimic the co-worker's previous proposal (Charness et al. 2016).

that laboratory measures of conditional cooperation forecast productivity in the workplace. Finally, laboratory experiments have long been used by policy makers as a guide, i.e., to provide qualitative insights. The Arizona Corporation Commission (ACC) used laboratory experiments to gain insights into incentive regulation (see Cox and Isaac, 1986 and Rassenti and Smith, 1986). Laboratory experiments were then further used as a guide to inform electric decentralization/privatization in US, Australia and New Zealand (Rassenti et al., 2002). Therefore, while we do not wish to downplay the importance of field evidence on salary negotiations, we also believe that laboratory experiment can be seen as a promising first step to shed light on real world issues.

3. Experimental design

The experiment was conducted at a major university using z-Tree software (Fischbacher, 2007). It consisted of 12 sessions (four per treatment) with 219 participants in total, who were undergraduate university students recruited online using ORSEE (Greiner, 2015). No participant could participate in more than one session. The average length of a session was around 70 min and average earnings were 10.95€.

We consider a modified version of the game in Falk et al. (2006). We wanted to implement the simplest design to answer the key question we were interested in, i.e., how does cheap talk and its public revelation impact market outcomes in a worker-firm setup? As in their setup, participants were randomly assigned a role as either a firm or a worker and the role was fixed for the entire duration of the experiment. In contrast to Falk et al. (2006), we allowed for wage discrimination. This had to do with the fact that we were interested in studying the effect of wage proposals on worker wages. Imposing uniform offers would not allow us to do that. In each period, a firm was randomly matched with two workers. The matching changed at random in each period. In Falk et al. (2006) each firm was matched with three workers. However, in one of our treatments, we want to provide workers with different levels of information about the other workers' decisions, so the analysis will not be transparent if a worker received information about two other workers. Therefore, to analyze the effect of information in a neat way, we decided to match each firm only with two workers. Due to this variation, we also altered the payoff structure. Falk et al. (2006) have a decreasing marginal revenue for firms (on the number of hired workers), while in our case marginal revenue is constant. The reason is that as in our setting we allow for wage discrimination and also for different workers' wages proposal, the analysis will be more precise if the other parameters (marginal revenue) are symmetric. Subjects first read the instructions and then roles were assigned.[7] Participants had to answer some questions after finishing reading the instructions (see Appendix A2 for further details) to make sure they understood them. They could only participate in the experiment on successfully answering all the questions.[8] The experiment lasted 15 periods. Subjects were informed in the general instructions about the number of periods.

The structure of the game is as follows: in the first stage, the firm decided whether to make a wage offer to each worker or not,[9,10] while in the second stage, workers receiving an offer decided whether to accept it or reject it. The surplus was only realized when a wage offer was accepted by a worker. A rejected offer implied that neither the firm nor the worker realized any gains. Another difference with the Falk et al. (2006) design is that we do not use the strategy method to elicit workers' decisions (acceptance or rejections) on the offered minimum acceptable wages. To avoid potential confounds regarding reciprocity concerns, workers were homogenous and did not differ in their productivity levels.

We considered three different experimental treatments manipulating whether workers were able to make ex-ante proposals (PRO v. BASE) and whether those proposals were made public (PUB v. PRO):

Baseline (BASE): A firm makes a wage offer, or not, to one or both workers. A worker receiving an offer decides whether to accept or reject it. Worker information was private, and they only knew if they received an offer or not, they did not know whether other workers received an offer.

Private proposals (PRO): Prior to Stage 1 of the BASE, workers first made a "wage proposal" (this stage was compulsory for all workers).[11] The proposal remained private information and was not disclosed to the co-worker. Firms knew that the proposals were not binding, and they could make an alternate (or no) wage offer. Workers only knew if they received an offer or not, they did not know whether other workers received an offer.

Public proposals (PUB): The only difference with PRO is that at the end of each period workers could see the co-workers' (we will use hereafter this term for simplicity to refer to the other worker that is matched with the same firm) proposal in the previous period.[12] Workers only knew if they received an offer or not, they did not know whether other workers received an offer.

Table 1

The payoff for workers and firms are summarized in Table 2 where w_i denotes the wage offer for the worker, $i = \{1, 2\}$. If an offer

[7] The instructions were read aloud. In each treatment both workers and firms had the same instructions (full instructions can be found in Appendix A).

[8] If a subject provided an incorrect answer the person was invited to read the instructions and try to pass the control questionnaire again. We did not have issues and all subjects managed to pass the control questionnaire.

[9] Following Falk et al. (2006), we frame the instructions as employer, employee and wages (see instructions in Appendix A1).

[10] The firm-worker framing is also used in García-Gallego et al. (2012).

[11] The exact question that workers had to answer in this stage was "What wage do you want to propose to the firm? (from 0 to 390).

[12] Note that because we have random matching every period, disclosing wage proposals at the end eliminates the incentive of making a proposal to influence the decisions a co-worker. This is in fact an important assumption of the theoretical model that we describe below. We thank an anonymous referee for pointing this out.

Table 1
Experimental design.

Treatment	Description	Time Line
Baseline (BASE)	Firms could make 0,1,2 wage offers in Stage-1. Workers accepted or rejected the offers. They saw own past offers. Firms saw own past actions and worker decisions.	Stage 1 → Stage 2 ***Firm*:** **Wage offer** *Worker*: Accepts/Rejects
Private Proposals (PRO)	Workers made non-binding "wage proposals" to the firms before the wage offer + BASE	Stage1 → Stage2 → Stage3 *Worker*: Wage proposal ***Firm*:** **Wage offer** *Worker*: Accepts/Rejects
Public Proposals (PUB)	PRO + workers could see all the other workers' past proposals.	Stage1 → Stage2 → Stage3 → Stage4 *Worker*: Wage proposal ***Firm*:** **Wage offer** *Worker*: Accepts/Rejects *Worker:* proposal revealed

Note: There were 4 sessions per treatment, 25 firms and 50 workers in BASE, 24 firms and 48 workers in both PRO and PUB.

Table 2
Payoffs.

Total offers	Total surplus	Worker decision	Firm Profits	Worker earnings
0	0	–	0	0
1	390	Accept	390-w_i, $i = 1,2$	w_i, $i = 1,2$
		Reject	0	0
2	780	Accept	780-(w_1+w_2)	w_i, $i = 1,2$
		Reject	0	0

was accepted, the worker received the agreed wage and the firm earned 390 points (see exchange rates below) minus the wage offer. At the end of the experiment, participants answered a questionnaire that included age, gender, zip code, studies, self-reported fair wage, reasons for wage discrimination (only for firms), Cognitive Reflection Test (Toplak et al., 2014), risk aversion (Bomb Risk Elicitation Task by Crosetto and Filippin, 2013) and the difficulty to recognize own mistakes (for further details on these questions see Appendix A3). The answers to the questionnaire allow us to control for subject heterogeneity.

The payoff functions, the number of rounds and the matching protocol were common information for participants in all treatments. Everyone was informed that they will be paid for one of the 15 rounds which was randomly chosen. They only knew their own exchange rate.[13] Exchange rates were set to have comparable payoffs across participants. The exchange rate for firms was 1 euro = 17.73 points and 1 euro = 21.67 points for workers.[14]

In all treatments, firms could only see their own wage offers and payoffs for current and previous periods at the end of each period.[15] Additionally, under PRO firms were also informed about wage proposals in the current and all previous periods, while workers were also informed about their own wage proposals after period one. Finally, in PUB workers were informed about the history of the other co-worker's wage proposals from all past periods.

[13] By informing subjects of their exchange rate at the start of the experiment, we are more likely to prevent feelings of disappointment and increase their willingness to participate in future experiments (Blount and Bazerman, 1996).
[14] Firms were informed that the exchange-rate was the same for all firms and it was the same for all workers too.
[15] Workers in Falk et al (2006) could see both their own and the firm's profits, in our case they only see their own payoffs. This was done to avoid issues of fairness arising, possibly resulting in greater amount of rejected offers, and confounding the results.

4. The theoretical model

In this section, we describe a theoretical framework that formalizes the key elements of our experiment. Our purpose is not to make pinpoint predictions but rather providing a simple theoretical framework that leads to simple predictions regarding overall treatment differences. We also argue that our theoretical framework provides a few general predictions (hypotheses) whose discussion helps us organize our empirical results.

We consider an ultimatum game between a "worker" (*he*) and a "firm" (*she*). Let $M \in \mathbb{R}_+$ be the endowment to be divided between the two parties. In our basic framework, the firm offers a wage to the worker, $w_o \leq M$, which in turn decides whether to accept or reject. If the firm's offer is accepted, the worker receives w_o and the firm collects $M - w_o$. If the offer is rejected, both parties end up with 0. For simplicity, we assume risk neutrality which involves linear utility functions over wealth (i.e., $M - w_o$ for the firm and w_o for the worker).[16]

Consistent with results in ultimatum games (see Camerer, 2011, pp. 48–63 for a review) we assume that the worker has a *minimum acceptable wage* $w_m \leq M$.[17] Thus, the worker will accept (reject) a firm's offer if $w_o \geq w_m$ ($w_o < w_m$). The worker's minimum acceptable wage can be of two types, low and high, indexed by $i \in \{L, H\}$ where $M \geq w_{m,H} > w_{m,L} \geq 0$. We denote by q the proportion of workers with a low minimum acceptable wage ($w_{m,L}$).[18]

In line with our experimental design, we consider three variations of this theoretical setting: (i) a baseline model where the firm does not receive any additional information about the worker's type (BASE); (ii) a private proposals model where a worker sends an ex-ante private signal to the firm in the form of a non-binding wage proposal (PRO); and (iii) a public proposals model where workers are informed about the co-worker's previous wage proposal before making their decisions (PUB). In the main text we simply describe these three models and summarize the main results. Moreover, in Section 4.4 we list the main hypotheses. All formal results in which these predictions are based are relegated to Appendix B.

4.1. Baseline (BASE)

Our baseline model corresponds to a standard ultimatum game where the firm does not have any more information about the worker's type other than the commonly known prior ($q < 1$). In this case, the firm decides whether to offer a high wage ($w_o = w_{m,H}$) that both worker types would accept or, offer a low wage ($w_o = w_{m,L}$) that will be accepted only with probability p.

By comparing the expected profits of the firm under low and high offers, it is easy to show (see Proposition 1 in Appendix B1) that the optimal strategy is for the firm to make a high offer unless the proportion of low types in the population (q) is high enough or making a high offer is relatively unprofitable (i.e., if $w_{m,H}$ is too high relative to $w_{m,H}$).

4.2. Private proposals (PRO)

Here we consider a modified version of the previous game in which the worker moves first by sending a non-binding wage proposal to the firm, $w_p \leq M$. Following insights from the cheap talk literature (see Farrell and Rabin 1996 for a review), we consider a situation where the wage proposal conveys information about the worker's minimum acceptable wage ($w_{m,i}$), with the possibility that the worker might be misreporting his private information. In particular, we assume that the low type worker's proposal is their minimum acceptable wage (i.e., reports truthfully) with probability $\lambda \in (0,1)$.[19] However, with probability $1 - \lambda$ the low type misreports, i.e., proposes $w_p = w_{m,H}$.[20] Therefore, when observing a high wage proposal, the firm does not know whether the worker is truly a high type, or a low type who is misreporting. The assumption that the worker, when proposing a wage to the firm, does not always misreport his minimum acceptable wage is consistent with the "aversion to lying" literature (e.g., Gneezy, 2005; Lundquist et al., 2009). A related possibility is that at least some people want to tell the truth and forgo potential gains from lying because they want to comply with

[16] None of the main predictions that we test in the experiment would change if we assumed risk aversion. Only the quantitative results might be different. It is easy to check that the wage offer should increase with the firm's level of risk aversion.

[17] Note that the existence of a minimum acceptable wage is also consistent with previous papers on rules of fairness in the workplace (e.g., Akerlof, 1982; Kahneman et al. 1986; Bottino et al. 2016). According to this interpretation w_m represents the worker's 'reference wage', that is, his idiosyncratic idea of a fair compensation.

[18] In an earlier version of this model, we assumed that the minimum acceptable wage follows a uniform continuous distribution (the document is available upon request). Our main qualitative results and predictions were not affected by this assumption. We thus focus on the two-type model for the sake of simplicity and clarity of exposition.

[19] According to Farrell and Rabin (1996): "[P]eople typically say what they want to have been believed even when the incentives clearly imply that cheap talk should not be believed, [that is] some people tell the truth despite incentives to lie" (p.104). However, that some people always propose their minimum acceptable wage is not key assumption in our model. Our main results would remain unchanged if we assume that everybody misreports, as long as some misreport more than others.

[20] In the continuous version of this model (available upon request) workers can misreport by a factor $b > 0$. The two-type model is essentially a particular case of the continuous model where $b = w_{m,H} - w_{m,L}$. The assumption that only the low type misreports is also captured in the continuous version because, given that the maximum report is M, those with a high minimum acceptable wage ($w_m > M - b$) cannot fully misreport; and those with $w_m = M$ will not misreport at all. Therefore, a high proposal in the continuous case is more indicative that the worker is not misreporting. Finally, note that in the discrete model, results would not be different if we allow the high type to misreport as well; this is because such a misreport will always be detected, and hence ignored, by the firm.

perceived "social norms" of not lying (López-Pérez and Spiegelman, 2013). In any case, for simplicity, we do not formalize whether it is optimal for the low type worker to misreport or not and, simply assume that this occurs with a commonly known probability $(1 - \lambda)$.

Note that, in our model, low proposals $w_p = w_{m,L}$ (which arise with probability λq) are "fully revealing" for the firm, because only a low type who is truthfully reporting would make such a low proposal. However, observing $w_p = w_{m,H}$ is only "partially revealing" because such a proposal might have come from a high type (with probability $(1 - q)$) or from a low type who is misreporting (with probability $q(1 - \lambda)$). It is easy to see that the firm would always meet the worker's proposal when it is "fully revealing". If, however, the wage proposal is "partially revealing" then the firm needs to consider the trade-off between the benefit of offering $w_{m,L}$ if the worker is misreporting, and the loss that comes from a rejection if the worker's proposal was his minimum acceptable wage, $w_{m,H}$. In other words, the firm must decide whether it pays off to believe the worker or not.

The optimal wage policy and the corresponding outcomes are described in Proposition 2 in Appendix B2. These results rely on our assumption that, when a worker first makes a proposal, he is sending a signal to the firm about his minimum acceptable wage. While making a high wage proposal is only partially revealing (such a proposal might come from a misreporting low type), it decreases the firm's belief that the worker is low type. Therefore, we show that the firm will be less likely to offer a low wage offer under proposals (PRO) than when proposals were not available (BASE). This result also implies that expected workers' income increases when wage proposals are available. However, we also prove that because acceptance rates will be higher, firms' might also be strictly better off under proposals. Thus, according to our theory, allowing workers to make ex-ante wage proposals can promote not only higher wages (both offered and accepted), but also an increase in profits and overall efficiency.

4.3. Public proposals (PUB)

In an extension to the previous model, we discuss the implications of making proposals public to co-workers. From a theoretical standpoint, making wage proposals public might affect workers' decisions if, for example, their behavior is influenced by a desire to conform to what co-workers do. Social psychologists refer to conformity as "the act of changing one's behavior to match the responses of others" (Cialdini and Goldstein, 2004, p. 606).[21] Conformity relates to "descriptive norms" in which people simply want to follow the behaviors of others. This contrasts with "injunctive norms" that prescribe what people should do, irrespective of how others actually behave. Notice that, in our setting, wage proposals will only be affected by the observation of others' proposals if people are following descriptive rather than injunctive norms. As we argue in Section 5.1, in our experiment, we find evidence that workers' proposals are influenced by co-workers' proposals when they are made public, a result consistent with our conformity assumption.

The simplest way to extend the PRO model to capture conformity is to assume that a worker's proposal will mimic the co-worker's previous proposal. This means that, instead of being purely random, a low type's decision to misreport in PUB is influenced by the co-worker's previous proposal. Therefore, the difference with the previous case is that, rather than being completely exogenous, when wage proposals are public workers' decisions to misreport are affected by previously received information on co-worker's proposals. As we show in the appendix (see Fig. B1 and Proposition 3 in Appendix B3), our notion of conformity leads to a higher percentage of workers who would accept low offers. This is anticipated by the firm who is then able to offer lower wages and get higher profits than when proposals were private. In fact, comparing outcomes across our three treatments (see Corollary 2 in Appendix B3), we find that for firms, the highest profits are in PUB and the lowest profits in BASE with PRO in the middle. The lower wage offers under public proposals also leads to a decrease in workers' average income relative to when proposals were kept private. Finally, we show that, because workers are more likely to ask for and receive high wages when they ask for them privately, conditional on the wage being accepted, income inequality among workers will be higher in PRO than in PUB and BASE (see Corollary 3 in Appendix B3).

4.4. Testable predictions

In this section, we provide testable predictions for our experiments. In our theory, wage proposals convey (imperfect) information about the worker's minimum acceptable wage; therefore, firms would, on average, offer higher wages to those making higher proposals. Our results also indicate that, because workers can misreport, the firm's optimal policy is sometimes to ignore high proposals and offer a low wage instead.

Hypothesis 1. (Wage offers and proposals)

(i) We expect firms' wage-offers to increase in the workers' proposals.
(ii) We expect average wage proposals to be higher than average wage-offers.

[21] Conformity is not only widespread, but also at the root of important findings in the economic literature (see, e.g., Bernheim, 1994; Clark and Oswald, 1998; Sliwka, 2007; Thöni and Gächter, 2015). Moreover, we can consider conformity as a type of "social influence": the fact that a person's emotions, opinions or behavior is affected by others. There are two types of conformity emphasized in the literature: "normative influence" and "informational influence". The former is often used to refer to situations in which individuals are susceptible to social influence in order to conform to or identify with others (Festinger et al. 1950; Asch, 1953; Cai et al. 2009; Fatas et al., 2018). Alternatively, informational influence (also known as "social proof") is used to describe social influence in a context in which the behavior of others is useful in order to infer inaccessible information about an objective state of the world (Banerjee 1992; Anderson and Holt, 1997; Goeree and Yariv, 2015; Muchnik et al. 2013). In this paper, we are agnostic about what type of conformism is more likely to affect subjects' behavior (but believe they are not mutually exclusive). Thus, our assumption is that people conform but we do not enter into the reasons why people conform.

(iii) We expect average wage-offers to be higher under proposals.

In Section 4.2. we argued that, compared to a situation without proposals, wage proposals can promote higher wages, profits, and overall efficiency because they provide information about the worker's type. In Section 4.3. we also argue that, under conformity in proposals, when co-workers wage proposals are made public, there will be a higher proportion of workers who will not reject low offers. Thus, workers will be more likely to accept lower wages in PUB than in PRO and this will promote firms to offer lower wages and get higher profits when proposals are public.

Hypothesis 2. (Public v. Private proposals)

(i) We expect similar wage proposals in PUB and PRO.
(ii) We expect higher accepted wages in PRO than in PUB.
(iii) We expect higher wage offers in PRO than in PUB.

We can also make some predictions about how proposals affect firm's profits, worker's income and acceptance rates (and hence overall efficiency) across all treatments.

Hypothesis 3. (Welfare effects across treatments)

(i) We expect workers' income to have the following ranking: PRO $>$ PUB $>$ BASE.
(ii) We expect firms' profits to have the following ranking: PUB $>$ PRO $>$ BASE.
(iii) We expect acceptance rates (and hence overall efficiency) to be higher under both PRO and PUB proposals than in BASE.
(iv) Finally, we make the following predictions regarding income inequality across treatments.

Hypothesis 4. (Income inequality across treatments)

(i) We expect the share of workers in total surplus to have the following ranking: PRO $>$ PUB and BASE.
(ii) Conditional on the wage offer being accepted, income equality among workers is higher in PUB and BASE than in PRO.[22]

5. Results

We use both non-parametric statistics and econometric analysis to test our hypotheses. Non-parametric tests (Mann-Whitney one-tailed tests, unless otherwise stated) are considered at an individual level to ensure independence. Observations are averaged for the 15 experimental rounds by individual. To be conservative with the independence hypothesis, non-parametric tests are also conducted at the session level. The econometric analysis (while controlling for additional effects) uses both Random Effects (RE hereafter) Logit and Generalized Least Squared (GLS hereafter) models. We first study wages and proposals with their acceptance rates. This is followed by welfare effects and income equality. Finally, even though we have a limited number of observations for firms, we also explore gender differences.

5.1. *Wages and proposals*

In this section, we are going first to report and analyze the average decisions (over periods and over individuals) related to wages and proposals for all three treatments. Then, we are going to plot the average workers' wage proposals and the average firms' wage offers in each period to examine the evolution over time. Finally, we will perform some econometric analysis to check the robustness of our results from hypothesis testing

Next Table 3 contains the descriptive statistics for wage offers and proposals. Differences between proposals and wage offers are positive on average (75.92 for PRO and 88.44 for PUB). We cannot, however, consider that wage proposals and wage offers are independent. Thus, we conduct a Wilcoxon matched-pairs signed-ranks test and find that proposals are statistically higher than wage offers in each period (PRO: maximum $p < 0.001$; PUB: maximum $p < 0.001$). This supports Hypothesis 1 (ii). In Fig. 2 above, we can see that this result holds in all 15 periods for both treatments. Consistent with Hypothesis 1 (iii), we see that wage offers by firms are higher (see Table 3) when workers can submit wage proposals (PRO and PUB) compared to the baseline (PRO-BASE: $z = -3.001$, $p < 0.001$; PUB-BASE: $z = -0.917$, $p = 0.017$). Interestingly, making wage proposals public (to the co-worker) decrease significantly wage offers by firms ($p = 0.018$) (Hypothesis 2 (iii)). And this is not due to the effect of the wage proposals that were similar in both treatments ($p = 0.956$). A possible explanation may be that firms learn over time that, as predicted by our theory, workers are less likely to reject low wage offers in PUB than in PRO. In Table 3, we also report the rejected [accepted] wages by workers which are those wages that were eventually rejected [accepted]. There are no differences in rejected wages in BASE and PUB ($p = 0.781$), while in line with Hypothesis

[22] Note that the hypothesis of the distribution of minimum acceptable wages is not included as a prediction to test. The reason is that with our experimental design we cannot test it. When a worker accepts (or rejects) a wage offer, the only information we can extract is that his/her minimum acceptable wage is below (above) that wage. This implies that an acceptance (rejection) only provide us with an upper (lower) bound of the minimum acceptable wage. We, however, cannot infer the magnitude of this divergence.

Table 3
Descriptive statistics for average wages and proposals.

	BASE	PRO	PUB
% Accepted offers	75 %	86 %	87 %
	(44)	(35)	(34)
Wage offers by firms	144.79	170.04	152.77
	(59.34)	(53.54)	(48.92)
Accepted wages by workers	160.41	177.17	158.96
	(55.30)	(51.45)	(47.50)
Rejected wages by workers	102.12	128.89	113.56
	(43.86)	(44.81)	(37.52)
Wage proposals by workers	–	235.43	234.66
		(66.39)	(78.26)
Proposals – accepted wages	–	55.38	74.92
		(53.78)	(68.89)
N(firms/workers)	25/50	24/48	24/48

Note: standard deviation in parenthesis.

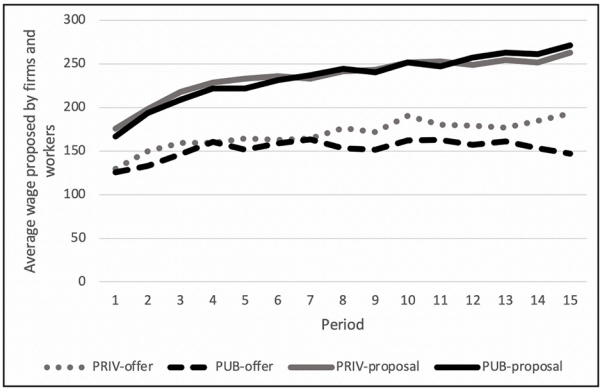


Fig. 2. Average workers' wage proposals and firms' wage offers over time.

2 (ii), in PRO rejected wages were significantly higher than in BASE ($p = 0.040$) or PUB ($p = 0.028$). The difference in PRO and PUB between the wage offers and the accepted ones was very small because the acceptance rates were quite high (95 % or 98 %) while in BASE the difference was higher due to a lower acceptance rate of 75 %. Although wage offers were higher in PUB than in BASE, accepted wages were not statistically different ($p = 0.795$). Nevertheless, workers in PUB were better off than in BASE due to a higher acceptance rate ($p< 0.001$). Finally, PRO was the best setting for workers because they received higher wages than in the other two treatments (maximum $p = 0.003$) and also, the acceptance rate was higher (than BASE, $p = 0.005$) or equal (to PUB, $p = 0.298$).

Next, we test Hypothesis 1(i), i.e., the wage offers increase with the wage proposals. Fig. 2 shows firms' wage offers and workers' wage proposals in PRO and PUB over time. The relationship of those two variables is positive with a correlation coefficient of 0.544 ($p<0.01$) for PRO and 0.452 ($p<0.01$) for PUB. Another way to test this hypothesis is to divide each treatment between high and low proposals (using the 50th percentile). We observe that in PRO high proposals get average offers of 175 while low proposals get 146 ($p<0.01$), while in PUB high proposals get an average offer of 163 while low proposals obtain on average of 135 ($p<0.01$) (see Fig. E1 in Appendix E to see wage offers for different intervals of wage proposals). Interestingly, the gap between workers' proposals and firms' wage offers is increasing under PUB and is greater than under PRO. This confirms Hypothesis 1(i). Note that there is no apparent difference between the proposals under PRO and PUB (this is confirmed below with the corresponding tests), however, wage offers under PUB are slightly flatter than those in PRO. This is reflected in the lower correlation coefficient (0.452) between proposals and wage offers under PUB. Finally, we observe that proposals and wage offers, under both PRO and PUB, have a positive trend over time.

Table 4 presents two RE Generalized Least Squares regressions where the dependent variable is the average wage offer made by firms.[23] The first explanatory variable, given the strong relationship observed in Fig. 2 above, is workers' *wage proposal*, computed as the average of the two proposals for the workers-firm pair in any given period. To control for heterogeneity, as it is usual in laboratory experiments, we use some of the variables extracted from our post-questionnaire (see experimental section): *female*, a dummy with value 1 if the firm is female and 0 otherwise; *risk lover*, a categorical variable that is 0 if the firm is risk averse, 1 if risk neutral and 2 if risk lover; *self-reported fair wage*, that is, firms' subjective opinion about what they considered to be a fair wage in a post-questionnaire; *high income*, a dummy with value 1 if the subject is among the 25 % of the subjects living in areas with higher per capita income and

[23] Results qualitatively hold if the dependent variable is the wage offer made by firms to each worker.

Table 4
RE GLS regressions on wage offers by firms.

	PRO (1)	PUB (2)	BASE vs PRO (3)	BASE vs PUB (4)	PRO vs PUB (5)
Wage proposal	0.412***	0.272***	−9.678	−7.688	0.323***
	(0.055)	(0.044)	(10.440)	(9.398)	(0.035)
Female	−1.844	12.076	−4.273	−3.508	3.217
	(12.384)	(10.996)	(4.361)	(4.172)	(8.383)
Risk lover	−3.472	−10.004*	0.151	0.209**	−6.198
	(6.308)	(5.298)	(0.105)	(0.089)	(4.110)
Self-reported fair wage	−0.044	0.198***	11.270	6.187	
	(0.071)	(0.076)	(9.700)	(10.460)	
High income	17.059*	−2.883	1.691***	0.715	6.633
	(9.314)	(9.851)	(0.579)	(0.489)	(7.142)
Period	1.392**	−0.336	−21.540**	−8.270	0.582
	(0.624)	(0.711)	(10.29)	(9.070)	(0.482)
BASE			−21.642**	−8.27	
			(10.289)	(9.07)	
PRO					12.38*
					(6.593)
Constant	66.686***	62.467**	129.500***	112.400***	76.37***
	(19.73)	(17.223)	(20.64)	(17.50)	(10.97)
R-squared	0.188	0.314	0.225	0.221	0.176
Observations	358	359	732	733	717

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

0 otherwise. We also consider the *period* to control for time trends and the dummies for the BASE and PRO treatments.

We test Hypothesis 1(i) in specification (1) and (2). The coefficient associated with *workers' wage proposals* is positive and significant for both PRO (0.412, $p<0.01$) and PUB (0.272, $p<0.01$). Higher proposals result in higher wage offers and this is independent of whether the proposal is private or public. It is worthwhile to note that the size of the effect under PRO is much higher than under PUB. Next, we make pairwise comparisons between treatments. Specification (3) confirms that wage offers were significantly higher in PRO than in BASE. Although, wages were higher in PUB, they were not significantly different between BASE and PUB (see dummy BASE in specification (4) of Table 4). Our econometric analysis thus finds strong support for Hypothesis 1(i), (ii) and partly for (iii) (though higher, average wage offers under PUB are not significantly different than in BASE). We state Results 1 and 2 below, which go in line with Hypothesis 1 and 2:

Result 1. 1) *Firms' wage-offers increase with workers' wage-proposals.*
2) *On average, wage-proposals are higher than wage offers.*
3) *Compared to BASE, wage-offers are higher in PRO and PUB, but only i*n PRO the difference is statistically significant.

Result 2. 1) *Wage proposals are similar in PRO and PUB.*
2) *Accepted wages are significantly higher in PRO than in PUB.*
3) *Acceptance rates are significantly higher when proposals are present.*

We finish the analysis performing an analogous econometric analysis for the wage proposals. In Table C1 of Appendix C, we present some RE GLS regressions on the wage proposals in the next period. First, we observe that in PRO (first specification), the co-workers' proposal in the current period has no significant effect on own proposal in the next period. Also, in PUB we find some support for the conformism hypothesis. First, when own proposal is above the co-workers' proposal (specification 2), the distance between own proposal and that of the co-worker has a negative effect on own proposal in the next period. This means that workers decrease their own proposal when they observe that it is above the other co-worker. However, this effect is not significant. We find an analogous effect when own proposal is below that of the co-worker (specification 3), workers increase their proposals in the next period. Now, this effect is significant. Thus, these results indicate some support for conformism, the main drive for the PUB predictions according to the model that we described in Section 4.3. Finally, we consider together both treatments (PUB and PRIV) and as expected, we find that there are no significant differences in wage proposals controlling for some individual characteristics, other co-workers' proposals (which has not a significant effect on own wage proposal) and using the observations for all 15 periods.

5.2. Profits, efficiency, and income inequality

In Table 5, we report descriptive statistics for firm and worker earnings, and income inequality. Relative to the baseline, worker earnings are higher under proposals (PRO-BASE: $z = -4.864$, $p < 0.001$). Relative to the baseline, workers' earnings are higher under both, PRO and PUB, proposals (PRO-BASE: $z = -4.864$, $p < 0.001$; PUB-BASE: $z = -2.615$, $p = 0.004$). Moreover, workers earn slightly more under PRO than under PUB (PRO-PUB: $z = 1.568$, $p = 0.059$), which confirms Hypothesis 3 (i). Interestingly, relative to the baseline, firms' profits are higher for public and private proposals. The difference, however, is only significant for PUB ($z = -2.680$, $p = 0.004$) and not for PRO ($z = -0.160$, $p = 0.873$, two-tails). Thus, Hypothesis 3(ii) is only partially supported. Moreover, the highest

profits for firms are attained when proposal are public (PRO-PUB: $z = -3.103$; $p = 0.001$). Thus, in line with Hypothesis 3 (ii) PUB is the most favourable treatment for firms.

Efficiency is only impacted in our framework if a contract between a worker and firm is not realized. This can occur if a worker rejects a wage offer or if a firm makes no wage offer to a worker. In both cases, workers and firms would get zero earnings, resulting in a deadweight loss and lower total surplus. Efficiency (measured as total earnings) does not appear to be different in PUB or PRO (PRO-PUB: $z = 1.043$, $p = 0.297$, two-tailed test), but it is higher when proposals are present (PRO-BASE: z=−3.464, p<0.001; PUB-BASE: $z = -4.872$, p<0.001).[24] This result is consistent with our theoretical framework (Hypothesis 3 (iii)).

We, next, test Hypothesis 4 where we look at the impact of proposals on income inequality. First, we observe that although efficiency and wages are higher when proposals are present, workers' share in total surplus declines slightly when proposals are public (vs. private) ($p = 0.024$). There are no differences in workers' share between BASE and PUB ($p = 0.223$, two-tails). These results support Hypothesis 4 (ii). Next, we consider two additional measures of inequality for all our treatments: overall inequality in the system (i.e., Gini index-overall), which measures how unequal are overall outcomes for both workers and firms, and inequality across workers (Gini index-workers).[25] Thus, the first measure captures inequality between firms and workers, while the second measure focuses on inequality only across workers. Moreover, to be consistent with our Hypothesis 4 (i), we will compute the Gini index only for accepted offers.

Gini index-overall variable on Table 5). This result is even more striking given that our workers are homogenous, and labor is the only input. We expect these results to be stronger if we include heterogeneity in skill or productivity levels of workers. Thus, allowing for proposals decreases overall inequality, while, making them public increases it slightly. Regarding income inequality only among workers, we observe a slightly different result. We find that the Gini index-worker is the lowest in PRO (0.157) and that workers' inequality is lower in PUB (0.164) than in BASE (0.172). Thus, allowing proposals decreases income inequality among workers. These results are partly consistent with Hypothesis 3(i). While our results support the theoretical prediction that making proposals public create a more equal distribution of wages relative to BASE, they are inconsistent with our prediction that PRO should be the most unequal treatment. Instead, our results show that BASE is the most unequal treatment. One possible explanation for this is that, in contrast to our simplifying assumption of commonly known priors in BASE, firms in our experiments might have had very different pre-conceived ideas about the workers' minimum acceptable wage. If that is the case, it is likely that wage proposals would decrease inequality in wage offers (and hence in workers earnings) by providing a clearer (if perhaps noisy) signal of the worker's type.

Below, we summarize our findings of some econometric regressions to check the robustness of the previous results. The tables for the regressions about profits and income inequality are relegated to Appendix D where we provide further details.

First, looking at firm earnings (see Table D1 in Appendix D), we find that, although they are higher under proposals, this effect is only significant when proposals are public. That is, firms' profits are significantly higher in PUB than in PRO. This is also what we found with the non-parametric statistical tests. Hypothesis 3 (ii) is thus supported except that PUB and PRO are not significantly different, while Hypothesis 3(ii) is also partially supported with the exception of the relationship of BASE and PRO.

Next, we present in Table 6 a series of RE GLS regressions where the dependent variable is total payoffs. The set of independent variables are the same as in Table 5 but now we include a dummy variable to control for treatment effects, PRO. We consider an additional dummy for the PRO treatment. We compare PRO and BASE in specification (1) and PUB and BASE in specification (2). Clearly, efficiency in BASE is significantly lower than in PUB or PRO (see coefficient of BASE dummy in specifications (1) and (2)). However, efficiency is not significantly different in PUB and PRO (see coefficient of PRO dummy in specification (3)) when controlling for other explanatory variables and exploiting all the information of the panel data structure. Thus, Hypothesis 3 (iii) is again supported.

Finally, if we focus on income inequality only amongst workers (see Table C2 in Appendix D), we find that inequality is significantly higher in BASE relative to PRO and PUB treatments. However, income inequality is not significantly different for public or private proposals. Thus, the econometric analysis supports Hypothesis 4 (ii) partially (except for PUB and PRO that are not significantly different).[26] When we analyze inequality in overall terms, we observe that income inequality is significantly lower in BASE than in PUB or PRO. This result clearly contradicts what we found in Table 5 according to the Gini index (overall). The most plausible explanation is that even though workers earn higher wages with proposals, this effect is dominated by the increase in firms' earnings due to higher acceptance rates in the presence of proposals. Finally, when proposals are private income inequality is lower that when they are public. This is in line what we found in Table 5 above. We summarize our findings in Result 3 (Hypothesis 3) and Result 4 (Hypothesis 4) below:

Result 3. 1) *Workers earn more under proposals (PUB and PRO) relative to BASE. The highest workers' earnings are achieved in PRO (weakly significant).*

2) *Relative to BASE, proposals increase firms' profits under proposals, although only significantly for PUB. Thus, the highest firms' profits are achieved in PUB.*

[24] See, Du Caju et al. (2008) for details on different forms of wage bargaining institutions.

[25] This is the ultimatum game version of the labor market institution where rejection of an offer results in zero surplus to both workers and the firm. We use this structure because most traditional markets are of this nature, where a rejection of an offer from one side results in zero surplus for both. Additionally, it allows us to see the effect of proposals in a clean environment without confounding effects such as effort provision.

[26] Our private and public proposals treatments resemble the design in Rigdon (2012) (demand side) ultimatum game experiment. Rigdon's research goal is to analyze the gender wage gap under private proposals and whether it can be mitigated with public information. Our focus is quite different from hers.

Table 5
Descriptive statistics for profits, efficiency and income inequality.

	BASE	PRO	PUB
Firms' earnings	334.90	347.63	390.12
	(163.14)	(128.58)	(132.68)
Workers' earnings	116.14	144.69	134.45
	(85.53)	(82.87)	(72.16)
Total earnings	568.88	635.69	658.67
	(263.79)	(217.45)	(209.06)
Workers' surplus share	20 %	22 %	20 %
	(0.11)	(0.11)	(0.09)
Gini Index: Overall	0.450	0.318	0.364
Gini Index: workers	0.172	0.157	0.164
N(firms/workers)	25/50	24/48	24/48

Note: standard deviation in parenthesis.

Table 6
RE GLS regressions on total payoffs.

	BASE and PRO (1)	BASE and PUB (2)	PRO and PUB (3)
Female	−0.066	−0.049	−0.005
	(0.049)	(0.040)	(0.038)
Risk lover	0.003	−0.003	−0.024
	(0.020)	(0.020)	(0.018)
Self-reported fair wage	0.00004	0.0002	0.035
	(0.0004)	(0.0003)	(0.030)
High income	0.044	0.040	0.0001
	(0.040)	(0.040)	(0.0002)
Period	0.009***	0.006**	0.006***
	(0.002)	(0.003)	(0.002)
BASE	−0.096**	−0.111***	
	(0.044)	(0.04)	
PRO			−0.039
			(0.035)
Constant	0.763***	0.766***	0.788***
	(0.092)	(0.072)	(0.051)
R-squared	0.137	0.192	0.105
Observations	735	735	720

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

3) *Acceptance rates (and therefore efficiency) are higher under proposals. Although, efficiency is the highest under public proposals, this is not significant when controlling for other effects.*

Result 4. 1) *Workers' share of total surplus is higher in PRO than in PUB or BASE. Income inequality measured through the Gini index is the highest in BASE.*
2) *Income inequality (only) among workers, conditional on the wage-offer to be accepted, is higher in BASE than in PUB or PRO.*

5.3. Gender analysis

Our experiment also provides some interesting results regarding gender effects that we discuss in this section. We first summarize the key papers in this literature and discuss how they relate to our experiment.

The experimental literature on gender differences in negotiation presents mixed results. Eckel and Grossman (2001) used the ultimatum game to study the gender gap in an environment where participants know their partner's gender (as opposed to our setting). They found that compared to men, women's wage offers are higher, while, as second movers, they are also more likely to accept wages. Solnick (2001) performs an ultimatum game experiment with two treatments, one where the partner's gender is known and another when it is unknown. Similar to Eckel and Grossman's results, he found that when gender is salient, males receive higher offers. By contrast, there are no gender differences in wage offers when the gender of the partner is unknown. However, in contrast to Eckel and Grossman's findings, females were more likely to reject offers. A possible explanation for these different results is that Solnick's experiment followed the strategy method and hence the impact of rejection decisions on the overall outcome is less obvious.

García-Gallego et al. (2012) also study gender differences in an ultimatum game. However, in their setup participants don't know their partner's gender. They have three treatments. In two of them workers perform a real effort task. We focus on the treatment where

Table 7
Descriptive statistics by gender.

	BASE		PRO		PUB	
	Male	Female	Male	Female	Male	Female
Proposals	–	–	243.45	226.71	227.41	239.85
Wage offers	152.39	136.33	172.27	169.15	152.62	152.89
Accepted wages	167.17	155.60	183.63	169.96	161.10	157.58
Rejected wages by workers	114.96	91.15	129	128.86	112.08	116.28
% Accepted offers	64 %	84 %	86 %	85 %	81 %	91 %
Firms' profits	353.17	315.11	357.56	343.53	388.54	392.76
Workers' income	105.41	127.68	151.8	136.95	128.34	138.82
N(firms/workers)	13/24	12/26	7/25	17/23	15/20	9/28

there is no real effort task (closer to our setting). Though not significant, and contrary to Eckel and Grossman (2001), they find that women offer less and reject more. As we did not inform subjects about their partner's gender or use the strategy method, our work is more closely related to García-Gallego et al. (2012) with no real effort task. Finally, Rigdon (2012) uses a Demand Ultimatum Game where partner's gender was unknown. She finds that, when proposals are made privately, females make significantly lower wage proposals than males, similar wage offer and accept offers more frequently. However, when proposals were made public, females make similar proposals and higher wage offers. Note that, Rigdon's baseline treatment is related to our PRO treatment, while her public treatment is related to PUB.[27]

Table 7 reports the descriptive statistics by gender in BASE, PRO and PUB. We do not find any gender difference for average wage proposals (PRO: $p = 0.353$, PUB: $p = 0.347$).[28] Although not statistically significant, it seems that, compared to men, women (as workers) make lower proposals in PRO, a result consistent with Rigdon's (2012) finding that women are more assertive in wage negotiations when they have access to public information. Indeed, if we explore the evolution over time of these variables (Fig. E2 in Appendix E), we observe that average wage proposals by women are below those of men in every period under private (PRO) proposals but, the opposite occurs under PUB with a few exceptions.

Although, not statistically significant ($p = 0.415$, *two-tails*), we observe that wage offers made by females are 12 % lower than those made by males in BASE. Additionally, we do not find gender differences in wage offers with proposals vs BASE (PRO: 172.27 vs 169.15; PUB: 152.62 vs 152.89) (PRO: $p = 0.634$ and PUB: $p = 0.655$, two-tails).

Regarding acceptance rates, female workers accept significantly more offers than males in BASE ($p < 0.001$) (opposite to what Gallego et al. (2012) find).[29] Compared to males, females have similar acceptance rates in PRO ($p = 0.902$, two-tails). Notice, however, that in PUB females have higher (than males) acceptance rates ($p = 0.018$). Regarding rejected wages offers, we observe that only in BASE, there are significant differences across gender since men reject on average higher offers than women (114.96 vs 91.15, $p <$ 0.001). Finally, there are no significant gender differences in firm profits or worker incomes except in BASE, where female workers receive higher income than males ($p = 0.019$), a result that follows from females having higher acceptance rates.[30]

We summarize our findings on gender below:

Result 5. When proposals are present there are no gender differences in wage offers, wage proposals, firms' profits or workers' income. Moreover, when proposals are private there are no gender differences in acceptance rates. Thus, the gender gap on acceptance rates and workers' income vanishes under proposals (respect to the case where proposals are not feasible).

6. Conclusion

In this paper, we have experimentally studied the impact of pre-play communication and information in a labor relationship. Pre-play communication is a common feature of many job negotiations but their impact in wage formation is little understood. Additionally, providing information on salaries has recently been explored in many countries, including the European Union, in an attempt

[27] While not our main focus, we also look at gender effects in our experiment (see Section 5.4). Wage proposals could be another avenue for gender wage discrimination if females have lower willingness to accept/propose. We find that making proposals privately (public), tend to increase male (female) wage proposals and hence overall income. Even though these differences are not statistically significant, this pattern of behavior resembles the "catch up" result in Rigdon (2012).

[28] Yamamori et al. (2008) conducted a dictator game experiment in which the recipient states a request for the minimum offer that they are willing to receive before the dictator dictates the offer, finding that the latter increases as the recipient's request increases to half of the share. Albeit in a quite different setting, their finding is in line with our own result that wage offers tend to increase with workers' proposals.

[29] Charness et al. (2016) argue that social comparison is important in labor markets and may affect one's attitude towards an employer or intrinsic motivation. This is similar to our idea of conformity (Cialdini and Goldstein, 2004), when rival proposals are public, where workers observe proposals of a worker from an earlier period. The only channel through which conformity works in our setup is through adjustment of wage proposals. Our idea of conformity assumes that a worker's proposal will mimic the co-worker's previous proposal (Charness et al. 2016).

[30] The instructions were read aloud. In each treatment both workers and firms had the same instructions (full instructions can be found in Appendix A).

to increase transparency in the labor markets.[31] In our main treatments, workers made wage proposals that were non-binding. In one scenario those proposals were only known by the firm, whereas in a second treatment wage proposals were public (only for co-workers). Despite wage proposals being non-binding, we still find that wage proposal can have important implications for workers and firms.

Our results indicate that pre-play wage proposals matter and promote higher average wage offers relative to the baseline without proposals both under private, and public, treatments. We also find that making proposals public increases firms' profits while, workers' wages are similar under both private and public proposals. Both private and public proposals lower rejection rates and hence increase efficiency relative to the baseline. This is an important result, as it shows that non-binding pre-play communication can have important welfare implications. We also explore the effects on income distribution. While workers earn more under proposals, wage proposals decrease income inequality. In fact, the workers' income is the most unequal in the baseline which is the traditional worker-employer setting studied in economics (without proposals). Finally, we also provide some evidence that making a private proposal, eliminates gender bias in acceptance rates and workers' income.

Our experiment also reveals another element of making wage proposals public. Even though average wages increase under proposals, they increase by a greater amount when proposals are private. Thus, we find that making wage proposals public mainly benefits the firm. We find some support in our experimental date that making proposals public generates a conformity effect where workers are less likely to reject, which decreases wages relative to the case where proposals are made privately. This result is contrary to popular belief, as indicated by the motivation behind some policy measures that have recently gained increased attraction. For example, wage disclosure policies in organizations to address income inequality with emphasis on fair remuneration or transparency have been recently enacted in Switzerland, Norway, Denmark, UK and several US states)[32,33] Furthermore, recently the EU commission has presented a proposal as regards wage transparency that aims to guarantee the same wages for the same work and to address gender discrimination. We find that while the use of proposals eliminates some gender differences, making information public might also end up benefiting firms more than workers.

Our paper is a first step in trying to understand the complicated interaction between public and private information in labor markets and its subsequent impact on worker' wages, firm profits and overall efficiency. While inequality in salaries in the workplace is a growing policy concern, its wider implications towards work performance and well-being are not yet clear. Moreover, it remains as an open question what the effect of wage proposals in the labor market will be when effort levels are considered, when other type of negotiations (e.g., auctions) are included or when proposals are optional rather than compulsory for workers. Finally, it would be interesting to further study alternative behavioral mechanisms. While our theoretical model is based on the ideas of cheap talk, aversion to lie, and conformity, it is also possible that non-binding wage proposals create focal points affecting the firm's wage offer decision. Under this alternative explanation, workers who misreport might simply be better able to anticipate the effect of focality on the firm's decisions.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

Appendix

Appendix A1. Instructions for PRO treatment[34]

General instructions

You are taking part in an economic experiment. Please read the following instructions carefully. Depending upon the decisions you make you can earn additional money in addition to the 3 Euros fee for your participation. It is extremely important that you read the instructions carefully.

Absolutely no communication whatsoever is allowed in the course of the experiment. Please address questions you might have to us directly. Any violation of this will lead to the exclusion from both the experiment and all payments.

This experiment consists of companies and employees. Each individual will be assigned randomly the role of a company, or employee, and will maintain the same role during the entire experiment.

The entire experiment comprises of 15 periods. In each period, each company will be randomly matched with two employees.

[31] If a subject provided an incorrect answer the person was invited to read the instructions and try to pass the control questionnaire again. We did not have issues and all subjects managed to pass the control questionnaire.

[32] Following Falk et al. (2006), we frame the instructions as employer, employee and wages (see instructions in Appendix A1).

[33] The firm-worker framing is also used in García-Gallego et al. (2012).

[34] The exact question that workers had to answer in this stage was "What wage do you want to propose to the firm? (from 0 to 390).

The identity of the employees will not be disclosed to any company before or after the experiment. Likewise, employees will not know with which firm they have been paired or the identity of other employees who are assigned to the same company as them.

Decisions in each period

At the beginning of each period, the company will receive a salary proposal from her two potential employees. The salary proposal is not binding, that is, companies can decide whether to make the proposed offer, another offer or no offer. The proposals will be private, that is, each employee will only know his proposal (not the one of the other employee).

After learning the salary proposals, the company can submit a salary offer separately to one, or both, employees, or submit no offer at all. Each offer received by an employee is known only to them.

Once an employee learns the salary offer and its amount, they will have to decide whether to accept or reject it. Employees will never know whether the company they are paired with has submitted an offer to the other employee.

Employees learn only the amount of their own salary offer. They don't know if the company submitted any other salary offers. If, for instance, a company submits a salary offer to one employee and a different one to the other employee, none of the employees will learn the other employee's offer.

The company's income in each period

When an offer is accepted, the employee and the company close a contract. This will generate the following income for the company:

- If the company concludes a contract with the two employees, she will achieve an income of 780 points - salary offered to employee 1 - salary offered to employee 2.
- If the company concludes a contract with one employee, she will achieve an income of 390 points - the salary offered to the employee who accepted the offer.
- If the company concludes no contract at all (because she has not made an offer or because her offers has not been accepted), she will achieve an income of zero points.

The employee's income in each period

- If no offer of salary is submitted to you, your income amounts to zero.
- If you accept the salary offer, your income will be the amount of the salary offered.
- If you reject the salary offer, your income will be zero.

EXAMPLES of how income is calculated in a period

1. The employee 1 makes a salary proposal of 70 points and employee 2 of 150 points. The company submits two salary offers, 120 points to employee 1 and 120 points to employee 2. Both reject the offer:

-Income for the company: 0

-Income for the employees: 0

2. The employee 1 makes a salary proposal of 250 points and employee 2 of 100 points. The company submits two salary offers to the two employees, 80 points to employee 1 and 200 to employee 2. If both accept the offer:

-Income for the company: 780–80–200 = 500

-Income for employee 1: 80

-Income for employee 2: 200

3. The employee 1 makes a salary proposal of 65 points and employee 2 of 220 points. The company submits a salary offer to employee 1 of 180 points. If employee 1 accepts the offer:

-Income for the company: 390–180 = 210

-Income for employee 1: 180

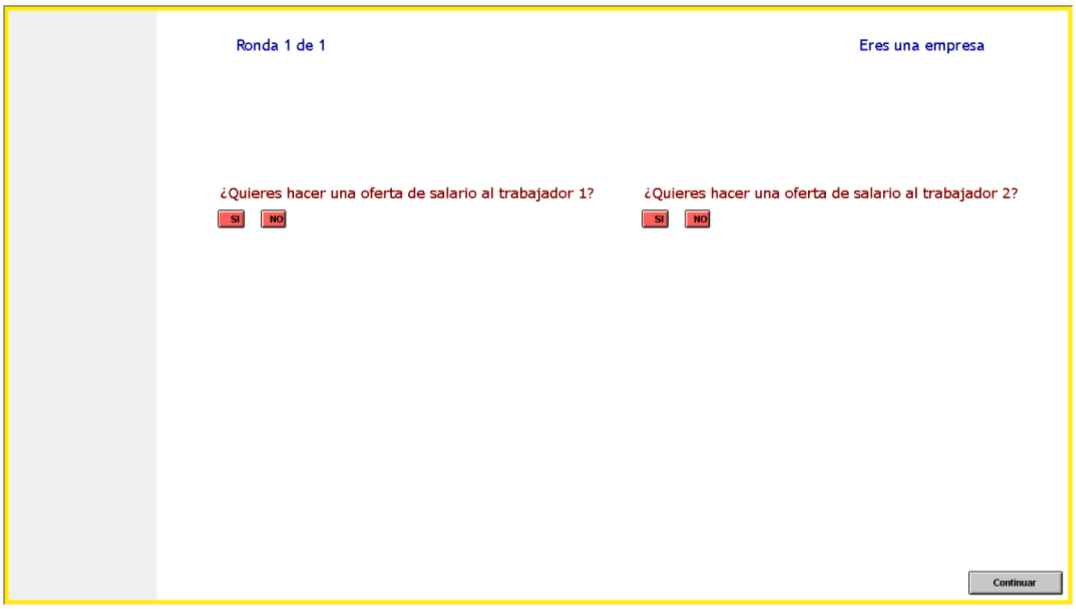
-Income for employee 2: 0

Please note:

- The salary you offer to be paid to the employee only if the offer is actually accepted.
- The above mentioned rules apply to all companies and all employees. They are known to each company and to each employee.

How to make your decision

All decisions will be made on the screen. At the beginning of each period, you will be shown the following screen for companies:



On this screen, the company will have to decide whether to submit a salary offer to each employee. To do so, the company must click either “Yes” or “No” in the respective input fields.

If the company clicks “Yes” for a particular employee, then she will be asked to enter the amount of the salary offer she wants to make to that particular employee.

If the company clicks “No”, that particular employee will not get a salary offer.

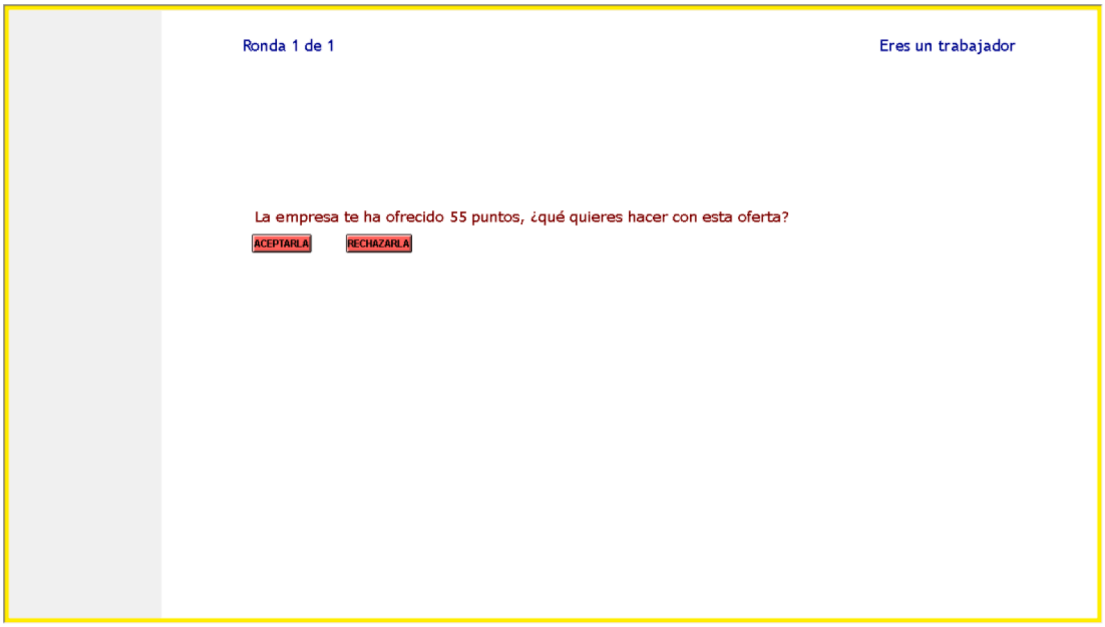
The permitted numbers for salary offers are between 0 and 390:

$0 \leq salary\ offer \leq 390$

Once the company has made her decision(s) and entered the input, she must click the OK button. Important, the company can revise her decisions as long as the OK button is not activated.

To finish this stage, the company must click on the “NEXT” button (on the right bottom corner).

The following screen shows the decision that the employee will have to make in the event that they have received a salary offer:



On this screen, the employee will be informed of the exact amount of the offer. Afterwards, the employee must decide whether to accept or reject the offer by clicking on "accept" or "reject".

If the employee has not received an offer, the message "The company has decided not to make any offer to you in this period" will appear.

The income for that period will then appear on the screen.

This concludes the period. In the following period, each company will be randomly assigned two new employees. At the end of each period, the company will be able to see the salary offers of each employee and the income of the previous periods. Employees will see the offers received (only their own) and their income from previous periods.

Before starting the experiment, we will tell you on the computer screen the equivalence between points and Euros.

You will only be paid the points corresponding to a randomly chosen round by rolling a die.

Appendix A2. Control Questions for PRO and PUB treatments[35]

It is mandatory to answer every question. Wrong answers have no consequences. Address any questions to us!

1 Employee 1 makes a wage proposal of 100 points and employee 2 of 120. The company does not make wage offers to any of the employees. What is the income in points for,
- The company: 0
- Each of the employees: 0

2 Employee 1 makes a wage proposal of 80 points and employee 2 of 120. The company sends wage offers to employee 1 and 2 for a value of 250 points. What is the income in points for,

(a) Both employees accept the offer. What is the income in points for,

- The company: 280
- Each of the employees: 250

(b) Employee 1 accepts the offer and 2 rejects it. What is the income in points for,

- The company:140
- Employee 2: 0

3 Employee 1 makes a wage proposal of 30 points and employee 2 of 70. The company sends a wage offer for a value of 30 pints to employee 1 and a wage offer of 60 points to employee 2. What is the income in points if,

(a) Both employees accept the offer. What is the income in points for,

- The company: 690
- Each of the employees: 60

(b) Employee 1 accepts the offer and 2 rejects it. What is the income in points for,

- The company:360
- Employee 1: 30

(c) Both employees reject the offer. What is the income in points for,

- The company: 0
- Each of the employees: 0

Appendix A3. Post-questionnaire

In this questionnaire we ask you to give us some general information about yourself. After carefully reading each section, we ask you to answer by writing an "x" in the appropriate box. Please, answer all the questions.

Thank you for participating!

General information:

1. Date of birth:

[35] Note that because we have random matching every period, disclosing wage proposals at the end eliminates the incentive of making a proposal to influence the decisions a co-worker. This is in fact an important assumption of the theoretical model that we describe below. We thank an anonymous referee for pointing this out.

2. Gender: a) Male: □ b) Female: □

3. School and Degree that you study at the university:

School:……

Degree:……

4. What is the zip code of your parents' house?

5 . If Juan can drink a barrel of water in 6 days and Maria can drink a barrel in 12 days, how long do they need to drink a barrel between the two of them?

6. Juan receives the fifteenth highest grade in his class and at the same time the fifteenth lowest grade in his class. How many students are there in class?

7. A man buys a pig for € 60, sells it for € 70, buys it again for € 80, and finally sells it for € 90. How much money has he made?

8. Simon decides to invest € 8000 in shares one day at the beginning of 2018. Six months after investing, on July 17, the shares he bought decrease in value by 50 %. Fortunately, from July 17 to October 17, the shares you have purchased increase in value by 75 %. At this moment, Simon a. did not win or lose anything in the stocks market, b. his shares have a higher value tan when he started, c. he lost money (his shares lost value)

9. Imagine that you are participating in a program in which you have to decide how many boxes to open out of a total of 100 numbered boxes. All boxes contain € 10 except one that has € 0. You do not know where the box with no money is, only that it can be in any of the 100 boxes with the same probability. The boxes are opened in numerical order. If, for example, you decide to open 20 boxes, the boxes ranging from 1 to 20 will be opened; If, for example, you decide to open 57, all the boxes between 1 and 57 will be collected.

How many boxes would you decide to open in this situation?

10.- What do you think is the appropriate salary for a worker? (Remind that it must be a number between 0 and 390):

11.- If you have participated in the experiment as a company and you have chosen different salaries for your two workers in the same period, why have you done it? (If you have not been a company, please write "I am a worker").

12.- If you have participated in the experiment as a worker, what is the minimum wage you would be willing to accept? (If you have not been a worker, please write "I am a company").

13.- Do you think it is difficult for you to recognize your mistakes?

Yes

No

Appendix B. Theory details and formal proofs

In this appendix, we describe the details of our theory described in Section 4 of the main text. Unless otherwise specified we keep the same nomenclature.

B1. Baseline (BASE)

We denote by $T = \frac{M - w_{m,H}}{M - w_{m,L}}$ the firm's profits from a high offer relative to the firm's profits from a low offer that was accepted. Therefore, $T < 1$ is a measure of the relative profitability of making a high wage offer. In the proposition below we provide the optimal wage (w_0^{BAS}) and the corresponding expected firm's profits (Π_F^{BAS}), expected worker's income (Π_W^{BAS}) and the acceptance rate (r^{BASE}). All proofs are at the end of this appendix.

Proposition 1. *(BASE): The optimal wage offered by the firm, and the corresponding expected firm's profits, expected worker's income and the acceptance rate are given by:*

$$w_o^{BASE} = \begin{cases} w_{m,L} \text{ if } q \geq T \\ w_{m,H} \text{ if } q < T \end{cases}; \Pi_F^{BASE} = \begin{cases} q(M - w_{m,L}) \text{ if } q \geq T \\ M - w_{m,H} \text{ if } q < T \end{cases} \Pi_W^{BASE} = \begin{cases} q w_{m,L} \text{ if } q \geq T \\ w_{m,H} \text{ if } q < T \end{cases}; r^{BASE} = \begin{cases} q \text{ if } q \geq T \\ 1 \text{ if } q < T \end{cases} \text{where } T = \frac{M - w_{m,H}}{M - w_{m,L}}.$$

Proof of Proposition 1. : The firm's optimal decision is to offer the low wage if $(M - w_m^L)q \geq M - w_m^H$; otherwise, she will offer the high wage. Thus, $w_o^{BASE} = \begin{cases} w_{m,L} \text{ if } q \geq T \\ w_{m,H} \text{ if } q < T \end{cases}$. The rest of the Proposition follows immediately from this.

B2. Private Wage Proposals (PRO)

In the following proposition we summarize the theoretical results of the private proposals model (PRO) described in the main text.

Proposition 2. *The optimal wage policy and the corresponding expected firm profits, expected worker income and the acceptance rate are given by:*

$$w_o^{PRIV} = \begin{cases} w_{m,L} \text{ if } w_p = w_{m,L} \\ \widetilde{w}_o^{PRIV} \text{ if } w_p = w_{m,H} \end{cases} \text{where } \widetilde{w}_o^{PRIV} = \begin{cases} w_{m,L} \text{ if } \widehat{q}^{PRIV} \geq T \\ w_{m,H} \text{ if } \widehat{q}^{PRIV} < T \end{cases};$$

$$\Pi_F^{PRIV} = \begin{cases} q\left(M - w_{m,L}\right) \text{ if } \widehat{q}^{PRIV} \geq T \\ M - w_{m,H} + q\lambda\left(w_{m,H} - w_{m,L}\right) \text{ if } \widehat{q}^{PRIV} < T \end{cases}$$

$$\Pi_W^{PRIV} = \begin{cases} qw_{m,L} \text{ if } \widehat{q}^{PRIV} \geq T \\ w_{m,H} - q\lambda\left(w_{m,H} - w_{m,L}\right) \text{ if } \widehat{q}^{PRIV} < T \end{cases}; r^{PRIV} = \begin{cases} q \text{ if } \widehat{q}^{PRIV} \geq T \\ 1 \text{ if } \widehat{q}^{PRIV} < T \end{cases}$$

where $= \frac{M - w_{m,H}}{M - w_{m,L}}$, $\widehat{q}^{PRIV} = P\left(w_{m,L} \mid w_p = w_{m,H}\right) = \frac{(1-\lambda)q}{1-q\lambda} < q$, and $\widetilde{w}_o^{PRIV}$ is the optimal wage offer conditional on the wage proposal being high.

(i)Proof of Proposition 2 **:** Applying Bayes rule we can compute the firm's belief that the worker is low type given the prior (q) and the observation that his proposal was high:

$$\widehat{q}^{PRIV}\, P\left(w_{m,L} \mid w_p = w_{m,H}\right) = \frac{P\left(w_p = w_{m,H} \mid w_{m,L}\right)}{P\left(w_p = w_{m,H}\right)} q$$

where $P(w_p = w_{m,H} \mid w_{m,L}) = (1 - \lambda)$ and $P(w_p = w_{m,H}) = 1 - q\lambda$

Therefore, when observing a high proposal, the firm's optimal decision is to offer a low wage if $(M - w_m^L)\widehat{q}^{PRO} \geq M - w_m^H$; otherwise, she will offer a high wage. Thus, if we denote by $\widetilde{w}_o^{PRIV}$ to be the optimal wage when observing a high proposal, we get $\widetilde{w}_o^{PRIV} = \begin{cases} w_{m,L} \text{ if } \widehat{q}^{PRIV} \geq T \\ w_{m,H} \text{ if } \widehat{q}^{PRIV} < T \end{cases}$

And because the firm always matches the proposal of the low type (which is fully revealing), the optimal firm's policy is:

$$w_o^{PRIV} = \begin{cases} w_{m,L} \text{ if } w_p = w_{m,L} \\ \widetilde{w}_o^{PRO} \text{ if } w_p = w_{m,H} \end{cases}$$

The rest of the proposition follows immediately from this.■

The following corollary, compares the outcomes of PRO with those in BASE

Corollary 1. *(PRO* vs. *BASE): Comparing the results when private proposals are available (PRO) with the results without proposals (BASE), we find that:*

$w_o^{PRIV} \geq w_o^{BASE}$; $\Pi_F^{PRIV} \geq \Pi_F^{BASE}$; $\Pi_W^{PRIV} \geq \Pi_W^{BASE}$ and $r^{PRIV} \geq r^{BASE}$

Proof of Corollary 1. First note that $\widehat{q}^{PRO} < q$ and hence, when comparing PRO and BASE there are three possible cases:

(i) $T \leq \widehat{q}^{PRIV}$

In this case, $\widetilde{w}_o^{PRIV} = w_o^{BASE} = w_{m,L}$ which means that, regardless of proposals, wage offers are the same in both cases, $w_o^{PRIV} = w_o^{PRIV} = w_{m,L}$, and this leads to the same firms profits $\Pi_F^{PRIV} = \Pi_F^{BASE}$; workers income $\Pi_W^{PRIV} = \Pi_W^{BASE}$ and acceptance rates $r^{PRIV} = r^{BASE} = q$.

(i) $T > q$

In this case, $\widetilde{w}_o^{PRIV} = w_o^{BASE} = w_{m,H}$. Therefore, expected firm's profits are:

$$\Pi_F^{PRIV} = q\lambda\left(M - w_{m,L}\right) + (1 - q\lambda)\left(M - w_{m,H}\right) = M - w_{m,H} + q\lambda\left(w_{m,H} - w_{m,L}\right) > \Pi_F^{BASE} = M - w_{m,H}$$

Expected worker's incomes are:

$$\Pi_W^{PRIV} = q\lambda w_{m,L} + (1 - q\lambda)w_{m,H} = w_{m,H} - q\lambda\left(w_{m,H} - w_{m,L}\right) \rangle \Pi_W^{BASE} = w_{m,H}$$

And acceptance rates are: $r^{PRIV} = r^{BASE} = 1$

(i) $T \in (\widehat{q}^{PRIV}, q]$

In this case, $\widetilde{w}_o^{PRIV} = w_{m,H} > w_o^{BASE} = w_{m,L}$. Therefore, firm's profits in PRO are (see case ii): $\Pi_F^{PRIV} = M - w_{m,H} + q\lambda(w_{m,H} - w_{m,L})$ while expected firm's profits in BASE are: $\Pi_F^{BASE} = q(M - w_{m,L})$ where $\Pi_F^{PRIV} > \Pi_F^{BASE}$ iff $M(1 - q) > w_{m,H}(1 - q\lambda) - qw_{m,L}(1 - \lambda)$. Note that for this condition not to hold $w_{m,H}$ should be relatively close to M (i.e., M sufficiently low) in which case $T > q$ and hence condition (iii) would not hold.

Expected worker's incomes are: $\Pi_W^{PRIV} = w_{m,H} - q\lambda(w_{m,H} - w_{m,L}) > \Pi_W^{BASE} = qw_{m,L}$

And acceptance rate are: $r^{PRIV} = 1 > q = r^{BASE}$

B3. Public Wage Proposals (PUB)

As we argue in the main text, making wage proposals public might affect workers decisions if their behavior is influenced by a desire to conform to what co-workers did. We capture conformity in our model by assuming that a worker's proposal in PUB will mimic the co-worker's previous proposal. This implies that, instead of being purely random, the low type worker's decision to misreport in PUB is influenced by the co-workers' previous proposal. Moreover, our notion of conformity also implies that when a worker, who was initially of the high type (i.e., $w_{m,H}$), is informed of a low proposal, i.e. $w_{p,c} = w_{m,L}$, the worker will then also make a similar low wage proposal ($w_p^{PUB} = w_{m,L}$). This, in effect, makes the worker a low type because, in our model, he cannot reject an offer that meets his proposal.[36] Thus, although both types of workers mimic their co-workers proposals, only high types indeed change their type (to low) because, in our theory, a worker cannot reject an offer that meets his proposal.

In the following figure, we show that the worker's proposal, given his initial minimum acceptable wage (and type), has a low minimum acceptable wage in PUB and all possible subsequent matches. From Figure 3 we can compute the total probability of the worker being of low type in PUB: $q^{PUB}\,P(w_m^{PUB} = w_{m,L}) = q(1 + (1-q)\lambda) > q$. Therefore, our notion of conformity implies that there will be more low type workers in PUB than in PRO, which is a key driver of the results in this section. In the following proposition we summarize the results for the public proposal case.

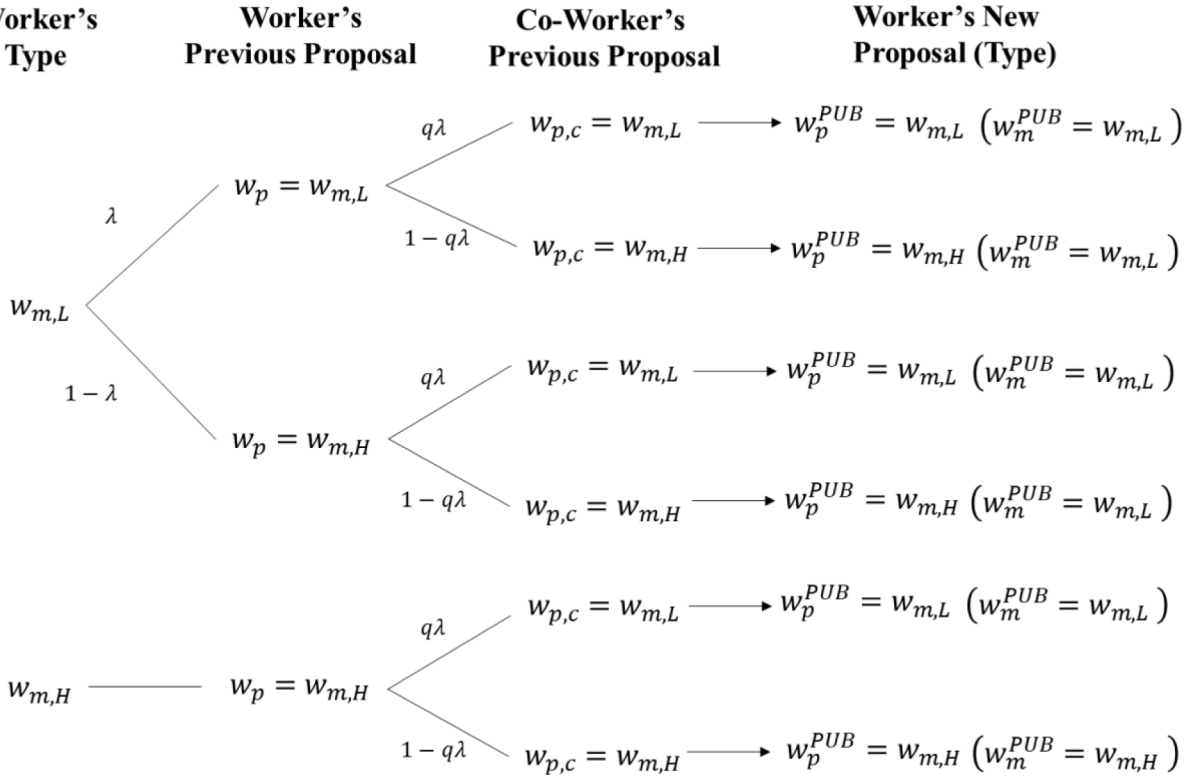


Fig. B1. Worker's proposal (and type) in PUB given own and co-worker's previous proposal.

Proposition 3. *(PUB). The optimal wage policy and the corresponding expected firm's profits, expected worker's income and acceptance rates are given by:*

$$w_o^{PUB} = \begin{cases} w_{m,L} \text{ if } w_p = w_{m,L} \\ \widetilde{w}_o^{PUB} \text{ if } w_p = w_{m,H} \end{cases} \text{ where } \widetilde{w}_o^{PUB} = \begin{cases} w_{m,L} \text{ if } \widehat{q}^{PUB} \geq T \\ w_{m,H} \text{ if } \widehat{q}^{PUB} < T \end{cases};$$

$$\Pi_F^{PUB} = \begin{cases} q^{PUB}\left(M - w_{m,L}\right) \text{ if } \widehat{q}^{PUB} \geq T \\ M - w_{m,H} + q^{PUB}\lambda\left(w_{m,H} - w_{m,L}\right) \text{ if } \widehat{q}^{PUB} < T \end{cases}$$

$$\Pi_W^{PUB} = \begin{cases} q^{PUB} w_{m,L} \text{ if } \widehat{q}^{PUB} \geq T \\ w_{m,H} - q^{PUB}\lambda(w_{m,H} - w_{m,L}) \text{ if } \widehat{q}^{PUB} < T \end{cases}; r^{PUB} = \begin{cases} q^{PUB} \text{ if } \widehat{q}^{PUB} \geq T \\ 1 \text{ if } \widehat{q}^{PUB} < T \end{cases} \text{ where} T = \tfrac{M - w_{m,H}}{M - w_{m,L}},\ q^{PUB} = P(w_m^{PUB} = w_{m,L}) = q(1 + (1-q)\lambda)$$

[36] By informing subjects of their exchange rate at the start of the experiment, we are more likely to prevent feelings of disappointment and increase their willingness to participate in future experiments (Blount and Bazerman, 1996).

$> q$, $\widehat{q}^{PUB} = P\left(w_m^{PUB} = w_{m,L} \mid w_p = w_{m,H}\right) = \frac{1-\lambda q}{1-\lambda q q^{PUB}} > \widehat{q}^{PRIV}$, and $\widetilde{w}_o^{PUB}$ is the optimal wage offer conditional on the wage proposal being high.

Proof of Proposition 3. Applying Bayes rule we can compute the firm's belief that the worker is low type given the prior (q^{PUB}), and the observation that his proposal was high:

$$\widehat{q}^{PUB} P\left(w_m^{PUB} = w_{m,L} \mid w_p = w_{m,H}\right) = \frac{P\left(w_p = w_{m,H} \mid w_m^{PUB} = w_{m,L}\right)}{P\left(w_p = w_{m,H}\right)} q^{PUB}$$

where $P(w_p = w_{m,H} \mid w_m^{PUB} = w_{m,L}) = (1 - \lambda q)$ and $P(w_p = w_{m,H}) = 1 - \lambda q q^{PUB}$.

Therefore, when observing a high proposal, the firm's optimal decision is to offer a low wage if $(M - w_m^L)\widehat{q}^{PUB} \geq M - w_m^H$; otherwise, she will offer a high wage. Thus, if we denote by $\widetilde{w}_o^{PUB}$ to be the optimal wage when observing a high proposal, we get $\widetilde{w}_o^{PUB} = \begin{cases} w_{m,L} \text{ if } \widehat{q}^{PUB} \geq T \\ w_{m,H} \text{ if } \widehat{q}^{PUB} < T \end{cases}$

And because the firm always matches the proposal of the low type (which is fully revealing), the optimal firm's policy is:

$$w_o^{PUB} = \begin{cases} w_{m,L} \text{ if } w_p = w_{m,L} \\ \widetilde{w}_o^{PUB} \text{ if } w_p = w_{m,H} \end{cases}$$

The rest of the proposition follows immediately from this.■

We can use Propositions 1–3 to compare results across our three treatments. In the next corollary, we focus on the most interesting case in which the firm finds it optimal to discriminate between proposals in PRO; while the wage offer in PUB and BASE can be rejected.

Corollary 2. *(PUB vs. PRO vs. BASE). If* $T \in (\widehat{q}^{PRIV}, q]$ *then:*

$\widetilde{w}_o^{PRIV} = w_{m,H} > w_{m,L} = \widetilde{w}_o^{PUB} = w_o^{BASE}$;

In this case, we have,

$$\Pi_F^{PUB} > \Pi_F^{PRIV} \geq \Pi_F^{BASE}$$

$$\Pi_W^{PRIV} > \Pi_W^{PUB} > \Pi_W^{BASE}$$

$$r^{PRIV} = 1 > r^{PUB} > r^{BASE}$$

Proof of Corollary 2. : First note that $\widehat{q}^{PUB} > \widehat{q}^{PRO}$ because $q^{PUB} > q$. Moreover, $\widehat{q}^{PUB} > q$ and $\widehat{q}^{PRO} < q$. Therefore, $\widehat{q}^{PUB} > q > \widehat{q}^{PRO}$. From Propositions 1–3, we know that if $\widehat{q}^{PUB} > q > T > \widehat{q}^{PRO}$, then $w_o^{BASE} = w_{m,L}$ (Proposition 1); $\widetilde{w}_o^{PRO} = w_{m,H}$ (Proposition 2) and $\widetilde{w}_o^{PUB} = w_{m,L}$ (Proposition 3). The rest of the Corollary follows immediately from these optimal wage offers. Regarding the rejection rates, note that the condition of Corollary 2 ensures that while every worker would accept the firm offer under private proposals, high type workers would reject it in PUB and in BASE. However, since there are less high type workers in PUB, the acceptance rate will be higher than in BASE.■

Corollary 3. *(Income inequality across treatments). If* $T \in (\widehat{q}^{PRIV}, q]$ *then,*

(i) Conditional on the wage offer being accepted, income inequality among workers is higher in PRO than in PUB and BASE.
(ii) Worker's income, as a share of the total surplus, is higher in PRO than in PUB and BASE.

Proof of Corollary 3. : Corollary 3 follows from our previous findings. Note that the firm offers higher wages to those who ask for it only under private proposals. However, workers receive low wage offers regardless of their proposals in PUB or BASE (Corollary 2). It follows then than under private proposals, the percentege of accepted high wages should be higher (Corollary 3.1) and worker's should be able to get a higher share of the total surplus (Corollary 3.2) than in the other two conditions. ■

Appendix C. Regressions on profits and income inequality

Table 4 presents four RE GLS regressions where the dependent variable is the own wage proposal in the next period. The first explanatory variable is workers' *own proposal*, which is the worker's wage proposal in the current period. This variable was included to account for time effects because we could not include the period since it is highly correlated with the other co-worker proposal and with the profit. We also consider *co-worker proposal* which is the co-workers wage proposal in the current period; *my proposal – co-worker's proposal*, which is the distance between own proposal and that of the other co-worker in the current period; *profit*, which is the worker's earnings in the current period and *private proposals* which is the dummy for the PRIV treatment. To control for heterogeneity, as it is usual in laboratory experiments, we use some of the variables extracted from our post-questionnaire: *female*, a dummy with

value 1 if the firm is female and 0 otherwise; *risk lover*, a categorical variable that is 0 if the firm is risk averse, 1 if risk neutral and 2 if risk lover.

Table C1
RE GLS regressions on workers' wage proposals.

VARIABLES	PRO proposal_next	PUB (my proposal above) proposal_next	PUB (my proposal below) proposal_next	PRO & PUB proposal_next
Own proposal	0.605***	0.640***	0.505***	0.618***
	(0.030)	(0.059)	(0.0614)	(0.021)
Co-worker proposal	−0.037			−0.003
	(0.028)			(0.020)
My proposal – coworker's proposal		−0.033	−0.151***	
		(0.063)	(0.050)	
Profit	0.151***	0.152***	0.107	0.143***
	(0.031)	(0.054)	(0.081)	(0.026)
Female	−3.633	12.13	3.238	1.778
	(3.796)	(8.293)	(8.205)	(2.880)
Risk lover	0.031	−0.038	0.0739	0.017
	(0.053)	(0.123)	(0.128)	(0.042)
Private proposals				−1.113
				(2.884)
Constant	79.62***	59.10***	80.53***	66.72***
	(10.20)	(18.98)	(17.54)	(7.520)
N	720	345	342	1439

Note: *My proposal above* refers to the case in which own proposal is above the co-workers' proposal. *My proposal below* refers to the case in which own proposal is below the co-workers' proposal.

Appendix D. Regressions on profits and income inequality

First, Table D1 contains four RE GLS regressions where the dependent variables are workers' earnings (columns 1- 3) and firms' profits (columns 4–6). The set of independent variables are the same as in Table 5 but now we include a dummy variable to control for treatment effects, PRO. Notice that in specifications 1 to 3 all the covariates will refer to workers' characteristics. Thus, worker proposals in specifications 4–6 refers to the average wage proposals made by the workers paired with the corresponding firm. We confirm that workers' profits are higher under proposals. Looking at Table 6, we find that in both cases the coefficients associated with BASE are negative and significant (−25.536 when compared to PRO and −17.435 when compared to PUB). Nevertheless, there are no significant differences in workers' earnings between private or public proposals. Thus, we find the same results as the ones provided by the hypothesis testing (except that the difference in workers' earning between PRO and PUB was weakly significant).

Table D1
RE GLS regressions on workers' and firms' profits.

	BASE and PRO (1) workers	BASE and PUB (2) workers	PRO and PUB (3) workers	BASE and PRO (4) firms	BASE and PUB (5) firms	PRO and PUB (6) firms
Female	0.309	13.277**	−4.793	−24.826	−18.938	−10.48
	(5.545)	(6.039)	(6.247)	(17.839)	(16.646)	(14.52)
Risk lover	–	–	–	9.307	4.453	−0.208
				(7.354)	(8.073)	(6.286)
Self-reported fair-wage	0.126***	0.106**	0.142**	−0.193	−0.204	−0.120*
	(0.044)	(0.045)	(0.057)	(0.163)	(0.142)	(0.070)
High income	−13.478**	6.426	−5.266	7.653	15.630	5.597
	(6.543)	(6.183)	(7.211)	(14.583)	(15.738)	(12.69)
Worker's proposal	–	–	0.146***	–	–	−0.743***
			(0.037)			(0.097)
Period	2.605***	1.371***	2.132***	1.641	2.156*	3.033***
	(0.451)	(0.399)	(0.456)	(1.267)	(1.245)	(1.018)
BASE	−25.536***	−17.435***	-	−20.432	−50.638***	-
	(5.178)	(5.687)		(16.427)	(15.711)	
PRO	–	–	4.852	–	–	−36.61***
			(6.542)			(14.01)
Constant	95.608***	90.947***	57.40***	380.453***	08.203***	564.9***
	(10.717)	(10.126)	(11.15)	(34.916)	(29.833)	(24.11)
R-squared	0.317	0.211	0.272	0.149	0.285	0.284
Observations	1470	1470	1470	735	735	735

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Next, we turn our attention to income inequality. In Table D2, we analyze it among workers using a RE GLS model where we consider two dependent variables. For specifications (1) to (3), the dependent variable is the distance between each workers income in a period minus the average incomes of all the workers in that period and treatment in absolute value but, restricted to those cases where there was an offer and it was accepted. For specifications (4) to (6), the dependent variable is the distance between each workers income in a period minus the average profits of all the workers and firms in that treatment in absolute value.

Table D2
RE GLS on the distance between workers' earnings and average earnings of all workers; and the distance between average earnings of all workers and firms in a treatment.

	Only workers			Workers and firms		
	(1) BASE and PRO	(2) BASE and PUB	(3) PRO and PUB	(4) BASE and PRO	(5) BASE and PUB	(6) PRO and PUB
Female	−8.172**	−7.117**	−7.366**	−0.309	−13.280**	6.699
	(3.837)	(3.494)	(3.266)	(5.546)	(6.039)	(6.485)
High income	−1.036	0.874	1.793	13.480**	−6.426	5.322
	(3.810)	(3.414)	(3.719)	(6.543)	(6.183)	(7.503)
Self-reported fair wage	0.063**	0.070**	0.152***	−0.126***	0.106**	−0.219***
	(0.031)	(0.029)	(0.026)	(0.044)	(0.045)	(0.424)
Period	−1.254***	−1.172***	−0.545**	−2.605***	−1.371***	−2.906***
	(0.288)	(0.269)	(0.266)	(0.451)	(0.399)	(0.272)
BASE	8.226**	11.68***		−43.470***	−74.110***	
	(3.573)	(3.222)		(5.178)	(5.687)	
PRO			1.517			−25.100***
			(3.377)			(6.817)
Constant	45.200***	38.39***	15.670***	540.50***	567.70***	588.60***
	(7.884)	(7.065)	(5.900)	(10.72)	(10.13)	(11.71)
R-squared	0.125	0.278	0.283	0.086	0.200	0.199
Observations	1135	1156	1197	1470	1470	1440

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Appendix E. Complementary Figures

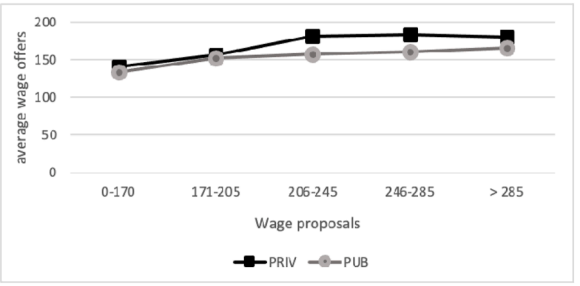


Fig. E1. wage offers for different intervals of wage proposal.

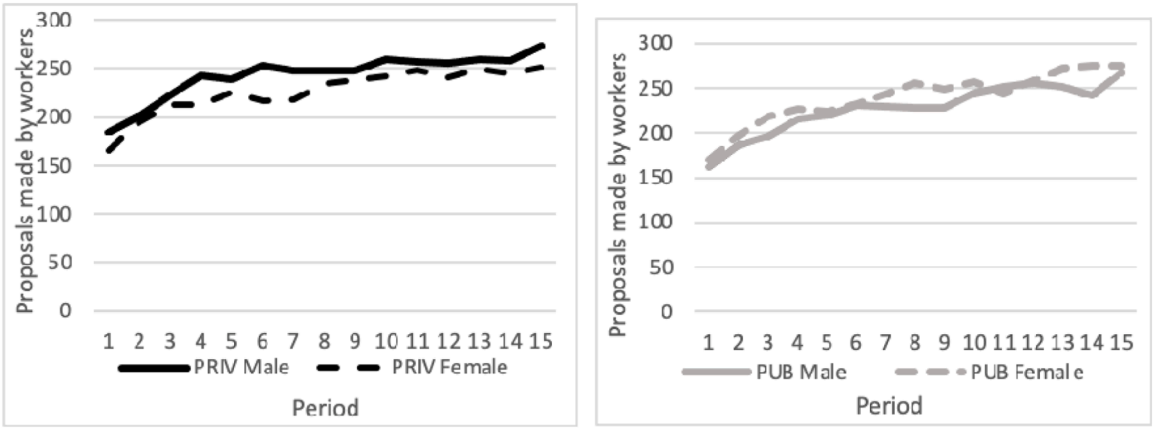


Fig. E2. Evolution in time of wage proposals by male and female workers.

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