An Ultimatum Wage Bargaining Experiment on Trade Union Efficiency

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Abstract

We present an ultimatum wage bargaining experiment showing that a trade union facilitating nonbinding communication among workers, raises wages by simultaneously increasing employers' posted offers and toughening the bargaining position of employees, without reducing overall market efficiency.

Keywords: Ultimatum Bargaining, Experiments, Trade Unions, Wages.

JEL: C92, C78, J51, J52.

1. Introduction

A widely accepted fact about trade unions (TUs) is that, by centralizing workers' bargaining strategies, they cause wages to rise.[5] However, despite unionization, in many markets, decentralized bargaining takes place because individual workers aim at personal rather than collective objectives or due to lack of coordination among different TUs.

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[5] _The trade unions with sufficient membership strength are able to bargain more effectively with the management than individual workmen_ (Justice Ahmadi, in _B.R. Singh v. Union of India_)_. For a rigorous rent- sharing approach to wage determination under collective bargaining, see Christofides and Oswald (1992).

In this context, a TU may have two opposite effects on market efficiency. First, by collectively setting a minimum acceptable wage, the TU toughens workers' attitude in decentralized negotiations. In that case, *ex post* (after wage offers are observed) rejection of a broader range of low wages reduces worker participation and market efficiency because some mutually beneficial employee-employer transactions do not take place. Second, the TU may cause employers' wage offers to rise in anticipation to a tougher attitude by workers. The *ex ante* rise of employers' offers will tend to enhance worker participation and, thus, market efficiency. However, the overall effect resulting from the interplay of these two effects has not been addressed so far, probably because real-world data are not informative on the bargaining process preceding observed wages.

Labor market experiments[6] offer information on both employees' and employers' strategies. Specifically, since its implementation in the seminal experiment by Güth et al. (1982), ultimatum bargaining constitutes a laboratory analogue of real-world transactions with take-it-or leave-it offers. While cheap talk messages from proposers to responders[7] and vice versa[8] have been studied in the context of ultimatum experiments, communication among respondents has not been studied so far. We undertake this task[9], using the analogy between non binding communication among respondents and a cheap talk TU providing a coordination device for workers engaging in decentralized transactions.

2. Experimental design and results

The results reported here were obtained from three paper-and-pencil sessions with 90 subjects, recruited among economics students at the University of Cyprus. At the beginning of each session, subjects were randomly assigned the role of an employer or a worker. Common written instructions were distributed to them.[10] They were not informed on the duration of the session. All sessions were stopped after period 15. In each period, an employer writes a wage offer X€, which may be any amount between 0€ and 10€, in steps of 0.1€. A worker, who is randomly chosen to be matched[11] with the employer in this period receives the offer and accepts or rejects it. In the case of acceptance, the worker earns X€ and the employer earns 10-X€. Otherwise, they both earn nothing. Subjects were paid

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[6] On the use of labor market experiments, see Falk and Fehr (2003).
[7] Rankin (2003).
[8] Andersson et al. (2008).
[9] Berninghaus et al. (2003) experimentally compare collective and individual bargaining, considering collective players with perfect control over coordinated individuals' strategies.
[10] Instructions translated from Greek and decision-feedback sheets are available upon request from the authors.
[11] Random employer-worker pairs were formed within 5 or 6 independent matching groups per session.

according to their earnings in five periods which were randomly chosen at the end of the session, yielding an average payment slightly below 17.5€ per subject.

In session 1[12], which is used as the baseline, there was no TU. Sessions 2[13] and 3[14] started in the same way as session 1. However, before period 7, subjects received new written instructions informing them that workers would exit the room and freely talk for 10 minutes. An experimentalist showed workers the way to another room which was isolated from the main session. Secrecy was guaranteed concerning the content of the communication among workers. In the meantime, another organizer made sure that no communication could take place among employers. After the union meeting ended, the experiment went on, keeping player roles and matching groups fixed.

Table 1 presents averages of proposed and accepted wages, earnings by subject type and the percentage of accepted offers. Overall, baseline offers approximately reproduce the usual 60%-40% split of the pie in favor of proposers. Thus, as pointed out in García-Gallego et al. (2008), the labor market framing adopted here produces similar results to those usually obtained from the abstract setup.[15] From the information contained in the table, we state a number of results which organize our statistical analysis and discussion.

	Wage offers	Wages	Employer earnings	Worker earnings	% of acceptances
Without TU	3.95	4.37	3.66	2.84	65%
With TU	4.45	4.74	3.63	3.28	69%
Overall sample	4.16	4.53	3.65	3.02	67%

Table 1: Averages of offers, wages and earnings and acceptance frequencies.

RESULT 1: *The TU increases wage offers.*

We check first whether the effect of the TU on employers' offers appears *before* or *after* employees' post-union reaction to past wage offers is observed.

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[12] 28 subjects in 4 matching groups of 4 and 2 groups of 6 subjects each.

[13] 32 subjects, in 2 groups of 4 and 4 groups of 6.

[14] 30 subjects, in 5 groups of 6 subjects each.

[15] A plethora of factors affecting behavior in ultimatum experiments, are discussed in Bearden's (2001) thorough review.

That is, whether wage offers increase *ex ante*, because the TU affects employers' beliefs concerning workers' minimum acceptable wage, or whether employers raise their offers *ex post*, after having observed workers' post-union behavior. We compare matching group averages using a Wilcoxon test. In session 2, there is a statistically significant difference in offers across periods 6 and 7 ($p=0.03$). In session 3, there is no significant *ex ante* effect on employers' offers ($p=0.34$). However, comparison between pre- and post-TU periods in session 3, shows that offers are significantly higher in the presence of a TU than in the absence of it ($p=0.07$). On the contrary, the *ex ante* reaction of employers to the union meeting in session 2 does not lead to a persistent increase of offers with respect to pre-union levels ($p=0.24$). Offers in periods 7-15 significantly vary across sessions 1 and 2 (Mann Whitney, $p=0.05$), which also supports result 1. In order to guarantee that the differences in offers across pre- and post-union sub-sessions are not due to other dynamics like for example learning, we have also tested and rejected the existence of any similar differences across the corresponding sub-sessions in session 1.[16]

RESULT 2: *The TU increases wages.*

Mostly, the tests performed here reproduce the patterns obtained from the tests on result 1. Specifically, while wages in session 2 vary significantly from period 6 to period 7 ($p=0.09$), pooling together pre- and post-TU data, yields no significant difference ($p=0.52$). Similar to the results reported on wage offers, in session 3, wages are significantly higher in periods 7-15 than in periods 1-6 ($p=0.07$), whereas there is no difference between periods 6 and 7 ($p=0.68$). Pooling together data from periods 7-15 in sessions 2 and 3, we find that wages in the presence of a TU are significantly higher than in the absence of it (Mann Whitney test, $p=0.04$). The lack of significant differences across sub-sessions 1-6 and 7-15 of session 1 shows that the wage differences across pre- and post-union sub-sessions should not be attributed to learning or other dynamics.[17]

RESULT 3: *The TU has a moderately positive effect on workers' earnings, leaving employers' earnings unaffected.*

We have tested for differences in workers' and employers' earnings across pre- and post-union periods. Apart from a subject's share of the pie from successful negotiations, this variable includes zero earnings due to rejected offers.

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[16] The significance of differences in offers across early (1-6) and late period (7-15) sub-sessions is rejected by a Wilcoxon test ($p=0.46$). The significance of differences between periods 6 and 7 is also rejected ($p=0.60$).

[17] The significance of wage differences across periods 6 and 7 is rejected by a Wilcoxon test ($p=0.50$). The significance of wage differences across early (1-6) and late period (7-15) sub-sessions is also rejected ($p=0.46$).

Taking matching group averages as independent observations and comparing pre- and post-union data, we find that the TU does not significantly change employers' earnings (Mann Whitney test, $p=0.81$), whereas the increase in employees' earnings fails by a small margin to pass the 10% significance threshold ($p=0.11$).

RESULT 4: *The TU reduces workers' willingness to accept a given wage, whereas the percentage of accepted offers is moderately increased.*

The two parts of result 4 may seem to contradict each other. However, an acceptance or rejection decision must be analyzed with respect to the wage offered in the first place. We do this by estimating a *Probit* model, in which the dependent variable takes the value 1 for acceptances and the value 0 for rejections. In table 2, the significance of the union dummy coefficient ($p<0.05$) implies that the TU reduces the probability of acceptance of a given offer. We find, also, that female workers are more likely to accept a given wage. Finally, session effects are non-significant. Interestingly, the negative effect of the union on acceptance probabilities does not translate into a lower percentage of overall acceptances. On the contrary, acceptances moderately rise from 65% to 69%.

Acceptance	Coeff	Standard error
Offer	0.94***	0.08
TU	-0.35**	0.14
Female W	0.50***	0.12
S2	0.19	0.16
S3	- 0.09	0.16
Constant	3.57***	0.35
Pseudo R^2	0.245	

Table 2: *Probit* results for the probability of an acceptance. *Offer*: wage offers, *TU*: dummy for data in the presence of a TU, *Female W*: dummy taking the value 1 if the worker is female, *S2*, *S3*: dummies for session 2 and 3 data. Significance: *=10%, **=5%, ***=1%.

3. Conclusions

We report results from an ultimatum bargaining experiment showing that a cheap talk trade union facilitating verbal non binding communication among workers raises employers' wage offers and observed wages without causing any efficiency loss. In our experiment, the union increases wages by simultaneously raising employers' offers and employees' likelihood of rejecting them. The overall effect on market efficiency has been positive because, *ex post*, workers accepted a higher percentage of the offers they received.

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