Experimental Economics (2019) 22:419–440
https://doi.org/10.1007/s10683-018-9579-y

ORIGINAL PAPER

Bargaining under time pressure from deadlines

Emin Karagözoğlu[1,2] · **Martin G. Kocher**[3,4,5,2]

Received: 21 July 2017 / Revised: 10 June 2018 / Accepted: 14 June 2018 / Published online: 27 June 2018
© The Author(s) 2018

Abstract

We experimentally investigate the effect of time pressure from deadlines in a rich-context bargaining game with an induced reference point at the 2/3-1/3 distribution. Our results show that first proposals, concessions, and settlements are very similar for different time-pressure levels. Nevertheless, time pressure systematically influences the type of agreements reached: the likelihood of bargainers reaching agreements on the equal split is lower under time pressure. Furthermore, disagreements and last-moment-agreements (conditional on reaching an agreement) are more frequently observed under time pressure, though the effect on last-moment agreements disappears when disagreements are included in the analysis. Finally, the effect of time-pressure on the frequency of disagreements is stronger for those pairs with higher tension in first proposals.

Keywords Bargaining · Deadline effect · Disagreements · Reference points · Time pressure

JEL Classification C71 · C91 · D74

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10683-018-9579-y) contains supplementary material, which is available to authorized users.

✉ Martin G. Kocher
martin.kocher@univie.ac.at

[1] Bilkent University, Ankara, Turkey

[2] CESifo Munich, Munich, Germany

[3] Institute for Advanced Studies, Vienna, Austria

[4] University of Vienna, Oskar-Morgenstern-Platz 1, 1090 Vienna, Austria

[5] University of Gothenburg, Göteborg, Sweden

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

1 Introduction

Whether it is wage negotiations, climate negotiations, political negotiations on disarmament deals or contract negotiations in general—a common feature is (often severe) time pressure toward the deadline for striking a deal in bargaining. Last-minute deals in international negotiations or in wage bargaining happen frequently. Debt ceilings such as the ones for the U.S. government or similar inherent deadlines create time pressure for negotiators that are involved in political deal making. In sports, registration deadlines for competitions such as the UEFA Champions League require teams to strike a deal on player sign-ups before a specified deadline, with very severe consequences if the deadline is missed. Despite the obvious relevance of deadlines and time pressure in bargaining, the theoretical investigation of *time* as a variable does often not lead very far, as equilibria in most frequently used bargaining models are implemented instantaneously. This is, for instance, true for the Nash bargaining game (Nash 1953), alternating offers bargaining game (Rubinstein 1982), and many versions of war of attrition games (Bulow and Klemperer 1999).[1] However, for practical bargaining problems, the timing of offers and deadlines play a central role in bargaining strategies and outcomes. As a consequence of the instantaneous nature of the equilibrium prediction, or the intricacies of full-fledged theoretical models taking timing into account, economists have mostly neglected issues of time pressure and deadlines in empirical assessments of bargaining.[2]

This paper provides empirical insights based on an experiment in a rich bargaining context (Gächter and Riedl 2005; Karagözoğlu and Riedl 2015; Bolton and Karagözoğlu 2016; Camerer et al. 2017) that yet has enough structure to rigorously control for important aspects in bargaining. It extends the scarce existing evidence on the effects of deadlines from simple and highly structured bargaining games such as the ultimatum game (Sutter et al. 2003; Cappelletti et al. 2011) to a more realistic environment that allows for taking strategic timing decisions of offers and other bargaining parameters explicitly into account. We implement time pressure resulting from a binding and known deadline.[3] Failure to complete tasks or reach agreements on time and the mistakes/bad decisions made under deadline pressure can have important economic consequences. Thus, for economists, it is relevant to understand the dynamics of bargaining with deadlines and time pressure. It may ultimately lead to richer models of bargaining considering time, timing, and psychological aspects of time as explicit variables.

Our setup builds on the setup of Roth et al. (1988) and more recent experiments by Gächter and Riedl (2005) as well as, for instance, Karagözoğlu and

[1] The Nash bargaining game is a one-shot, simultaneous move game. Hence, the immediate agreement result is trivially valid. That said, the same result is valid in various modified versions of it where a second stage is introduced (see Brams and Taylor 1994; Cetemen and Karagözoğlu 2014).

[2] Fershtman and Seidmann (1993), Ma and Manove (1993), Ponsati (1995), Damiano et al. (2012), Fuchs and Skrzypacz (2013), Şimşek and Yıldız (2014), Fanning (2016) and Karagözoğlu and Keskin (2018) are some papers that study the deadline effect/delay in bargaining and issues associated with it.

[3] Obviously, other forms of time pressure are possible and interesting as an alternative setup. A prominent alternative utilized by experimental economists is to have a *shrinking pie*.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Riedl (2015). The bargaining task is to allocate a salary budget of size $X \in \{\underline{x}, \bar{x}\}$ with $\underline{x} < \bar{x}$. A real effort task before the negotiations accompanied by a story frame in the experimental instructions creates reference point outcomes y_i and y_j for the two negotiators *i* and *j*. We implement $y_i > y_j$, and $\underline{x} < y_i + y_j < \bar{x}$. The latter condition mplies that implementing the reference levels is feasible with the larger budget but infeasible with the smaller budget. There is a possible second, implicit reference point in such environments: the equal split. The negotiation outcome is an allocation tuple $\{z_i, z_j\}$ with $z_i + z_j = X$, or disagreement, resulting in the allocation {0, 0} if the two bargainers do not agree.

Our experiment uses an unstructured bargaining protocol, which allows the sequence and the timing of offers to be endogenously determined. As summarized by Camerer et al. (2017), (1) the unstructured bargaining protocol offers the researcher much richer data – especially on the negotiation process – than the structured alternatives, (2) it is more realistic than those, and (3) structured theoretical predictions can still be obtained. Our main treatment variable in this setup is the time allotted to bargainers for reaching an agreement. In our low time pressure treatment (LTP), the bargainers are given a 10-min deadline, and in our high time pressure treatment (HTP), they are given a 90-s deadline. Further, we collected data for a 45-s deadline (SHTP: severely high time pressure) as a robustness check. Bargaining takes place anonymously in pairs through a real-time chat on the screen. Subjects bargain only once.

We observe a significant and sizeable increase in disagreement rates with high time pressure, and even more so with severely high time pressure. The disagreement rate rises from 4.5% under low time pressure to 31.4% under high time pressure (and to 38.1% under severely high time pressure), implying a very high level of inefficiency. In contrast to the results in many existing studies on structured bargaining, for which disagreement under time pressure is rare, the rich context with subjective entitlements and competing reference points seems to contribute to problems in reaching an agreement. The number of offers and counter-offers in our experiment indicate that it is not the physical limitations of time pressure that lead to the high numbers of disagreement. Even under severe time pressure, bargainers make several offers and counter-offers, but agreements often take place much closer to the deadline. Our data indicate that the time pressure has more explanatory power when explaining disagreements for those pairs with a larger difference in their first proposals. This observation can—at least partially—explain the much higher disagreement rate. It seems as if more distant initial proposals, and thus a higher level of initial conflict, can still be compensated for in negotiations with a looser deadline; but with a tight deadline and thus time pressure, the situation may lead to an impasse more easily. Interestingly, there are only small differences in the nature of the agreements (if reached) across the time pressure conditions. We observe a lower likelihood of implementing the implicit reference point (i.e., the 50–50 split) in agreements under high time pressure than under low time pressure. All other variables (e.g., first proposals, concessions) are identical in the two conditions.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

2 Literature review

While there is a quickly growing literature on the relationship between response times and decisions in (experimental) economics, including papers that explicitly take time pressure into account (Spiliopoulos and Ortmann 2014), there is virtually no tradition of economic bargaining experiments including a variation of the deadline for reaching an agreement. In negotiation science, in management, and in social psychology, in contrast, the literature on time and timing in bargaining is fairly large (see Lim and Murnighan 1994; Mosterd and Rutte 2000; De Dreu 2003; Moore 2004; Gino and Moore 2008; among others). Many of the studies in other disciplines, however, lack theoretical benchmarks, making it difficult to control for the (causal) effects of specific bargaining parameters. They often do not use salient incentives. Finally, some of these studies use integrative (non-constant sum) bargaining as opposed to distributive bargaining. For those reasons, we focus mainly on contributions from the economics literature.

Stuhlmacher et al. (1998) provide a meta-analysis of experimental studies on time pressure in bargaining. They show that the overall effects of time pressure depend on characteristics of the bargaining interaction such as the incentives given or the number of issues to be dealt with. However, the majority of the surveyed papers show an increase in concession-making and cooperation with a higher level of time pressure. A similar conclusion is drawn in an earlier meta-study on bargaining experiments in which time pressure is only one of several considered dimensions (Druckman 1994). However, Carnevale and Lawler (1986) as well as Mosterd and Rutte (2000) provide evidence that time pressure reduces the frequency of reaching agreements in bilateral negotiations in which bargaining parties can make offers and counter-offers. The dynamics in multi-faceted bargaining processes can be complex. Harinck and De Dreu (2004), for instance, report results showing that individuals might get locked into early impasses more often under low than under high time pressure.

Interestingly, the economics literature on time pressure in bargaining experiments, which is very small, goes to the other extreme. Sutter et al. (2003) experimentally investigate the impact of time pressure on proposer and responder behavior in a standard ultimatum game and observe that under time pressure responders reject about 60% of offers, whereas without time pressure responders reject only 20% of offers. Controlling for offers, rejection rates of responders are significantly higher under a tight than under a very weak time constraint. However, this effect vanishes in repeated one-shot play. Güth et al. (2005) look at deadlines in multi-period bargaining with constant and decreasing pie sizes. They show that a decrease in the pie size and alternating roles in repeated bargaining lead to earlier agreements, i.e. they attenuate the deadline effect. Cappelletti et al. (2011) investigate how proposers in the ultimatum game behave when their cognitive resources are constrained by time pressure and cognitive load. Time pressure leads to a slight increase in offers, but the effect is only significant in one condition (with high endowments). Cognitive load does not seem to have a systematic effect on offers. Finally, Alberti et al. (2017) show that longer horizons lead to more disagreements due to reduced concessions.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 1 Sequence of events

1.	Reading instructions aloud
2.	Performance task
3.	Elicitation of beliefs on performance
4.	Relative performance information
5.	Budget size allocated to pairs
6.	Subjective entitlements
7.	Bargaining
8.	Post-experimental questionnaire

3 Experimental design and hypotheses

3.1 Experimental design

We modify the experimental design introduced in Gächter and Riedl (2005) (and later used in several versions in Karagözoğlu and Riedl 2015; Gächter et al. 2015; Bolton and Karagözoğlu 2016) for our purpose. In this setup, randomly and anonymously paired subjects take on the role of department heads in a hypothetical company. They learn in the instructions (see the Online Appendix for details) that in the past, the top management of the company have distributed the salary budget based on the (relative) performances of two department heads. Now, due to exogenous, stochastic economic fluctuations, the available salary budget increases/decreases and the top management changes its policy. The two department heads will have to negotiate an allocation of the available budget among them, after performing a task.

The design (see Table 1 for an overview) induces an explicit reference point: we tell the bargainers that the top management of the hypothetical company they are working for paid the higher performing department head 14,000 points and the lower performing department head 7000 (when the salary budget was 21,000), although the current circumstances are somewhat different than the past. This implies a 2/3-1/3 division backed up by *earned status*. Yet, there is possibly a second, implicit reference/focal point: in such environments low performers usually resort to the 1/2-1/2 division, which can be backed up by (1) equality, (2) the fact that performances did not affect the size of the surplus to be shared, (3) the argument that the relevance of the asymmetric precedent is ambiguous. This setup has been shown to be successful in studying the influence of reference points implemented by precedents and subjective entitlements on bargaining behavior.

We vary the time available to the bargainers for reaching an agreement as a between-subject treatment variable. In our low time pressure treatment (LTP), the bargainers are given 10 min, and in our high time pressure treatment (HTP), they are given 90 s. Further, we collected additional data with a 45 s deadline for bargaining (SHTP: severely high time pressure) to check for robustness of results.[4] We also

[4] In the following, we will mainly focus on HTP and LTP. The findings from SHTP are very similar to those from HTP, and hence discussed separately in Online Appendix A.4.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

(randomly) vary the salary budget in the experiment (to make historical claims feasible or infeasible) as an exogenous treatment variable, which can be thought of as another robustness check of the results. While we were not interested in the effects of increases or decreases of the available budget per se (the design feature was implemented to allow direct comparisons with the existing literature), we control for their effects in the analysis. The budget size variation is implemented randomly within a given session. For practical reasons we conduct separate sessions for the different time pressure treatments.

3.1.1 Performance task

After distributing instructions on paper, reading them aloud, and answering questions in private, bargainers' performances are measured using a general knowledge quiz. The quiz consists of 50 multiple choice questions from various fields of knowledge. For each of these trivia questions there are five answer choices, and only one is correct (unanswered questions count as incorrect). Each participant receives the same set of questions in the same order and has 25 s to answer each question. All of this is made common knowledge among participants.

3.1.2 Elicitation of beliefs on performances

Since our subjects do not receive a precise information on the number of their (and others') correct answers, their entitlements (or fairness judgments) can be correlated with their beliefs on their relative performance in the task. Hence, we ask each subject to report her prediction on her own number of correct answers as well as her prediction on the number of correct answers of the other department head. These questions are incentivized using a linear scheme: for each perfect match between the guess and the actual performance, a subject earns 250 points. For each prediction with a deviation of 1(2) questions from the actual performance, a subject earns 125 (62.5) points; predictions with larger deviations do not receive any points. Subjects are informed about their earnings from this stage (i.e. the precision of their predictions) at the end of the experiment. For obvious reasons, the linear scheme is not perfect, but for our purpose it is sufficient.

3.1.3 Relative performance information

Once the real effort task is completed and beliefs are elicited, everybody is told who in their pairs was the 'high performer' and who the 'low performer', depending on the number of correct answers in the general knowledge quiz. In case of a tie, the one in the randomly assembled pairs who spent less time in answering questions becomes the high performer. If both subjects answered the same number of questions correctly and the time they spent in answering these questions was also identical, high and low performer roles are assigned randomly. If this possibility had realized, the pair would have been informed about it. Following the provision of relative performance information, subjects are reminded of the salary distribution when the salary budget was 21,000 points.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

3.1.4 Budget size

We randomly generate two budget values $X \in \{\underline{x}, \bar{x}\}$, one lower (15,000) than the status quo value of 21,000 and the other higher (27,000). For the first, historical claims (i.e. 14,000 and 7,000) are not jointly feasible, whereas for the second they are. We can check whether the influence of time pressure (if any) on bargaining differs across these two conditions that capture differently challenging bargaining situations. To determine whether a pair will negotiate over an increased or decreased budget, a six-sided die is rolled. It is emphasized in the instructions that (1) the budget determination is a purely random process, (2) each side of the die has an appearance probability of 1/6, and (3) the final outcome has nothing to do with the performances in the task. If a pair received a 1, 2 or 3 from the die roll, this implies bad economic conditions and a reduced salary budget of 15,000 points. Likewise, if a pair has a 4, 5 or 6 from the die roll, it implies good economic conditions and an increased salary budget of 27,000 points.

3.1.5 Subjective entitlements

We measure subjects' (potentially existing) subjective entitlements with a question, adapted from Babcock et al. (1995): "*According to your opinion, what would be a fair distribution of the salary budget from the vantage point of a non-involved, neutral arbitrator?*" Subjects are not informed about this question beforehand, and they know about their relative performances before they answer this question.

3.1.6 Bargaining

Bargaining is anonymous and unstructured in the experiment. Unstructured bargaining avoids exogenous first-mover effects and gives subjects as much bargaining freedom as possible (e.g., in the timing, sequence, number of proposals, communication used, etc.). In addition, it provides a rich data set on multiple layers of bargaining, which allows us to understand the effects of our experimental manipulation not only on outcomes, but also on the process of negotiations. This is particularly appealing for the study of time pressure in bargaining. Subjects exchange proposals that consist of an amount for themselves and an amount for the other department head. For convenience, sending inefficient proposals is not allowed (if the sum of the amounts a subject proposes is less than the total budget available, a warning message appears on the screen). An agreement is reached if one of the subjects accepts (by pressing an accept button on his/her screen) the other's standing proposal before the deadline. Subjects can also exchange verbal messages. A subject can send one verbal message (of unlimited length) per proposal (so that there is no confusion about which proposal is being discussed). Depending on the treatment, bargaining pairs have either 10 min (LTP: low time pressure) or 90 s (HTP: high time pressure). If subjects in a pair reach an agreement within the allotted time, their payoffs are implemented accordingly. If they do not, each subject in the pair earns zero points. Importantly,

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

subjects receive the instructions about bargaining after performing the knowledge quiz and answering the fairness question. Each subject plays the bargaining game only once.

3.1.7 Post-experimental questionnaire and payments

After the experiment, subjects are asked to report (1) their satisfaction about the bargaining outcome, (2) their opinion about the legitimacy of the quiz as a measure of general knowledge, and (3) their perceptions on the difficulty of the quiz (all on 7-point Likert scales). They are also asked to fill in justice centrality and belief-in-a-just-world questionnaires (Dalbert et al. 1987), a ten-item big-five personality questionnaire (Gosling et al. 2003), and a risk attitude questionnaire (Dohmen et al. 2011). Finally, subjects answer a few questions about their personal background (e.g., age, gender, field of study, monthly disposable income, etc.). Subjects were paid their earnings in private once everyone had finished the questionnaire part. Earnings were rounded at the end of the session (i.e., after summing up all earnings from predictions and bargaining stages).

The experiment was programmed with z-tree (Fischbacher 2007). We conducted the experimental sessions at Bilkent University throughout 2014 and 2015.[5] In total, 360 students from various backgrounds with an average age of 21.3 participated in the experiment. A typical session lasted about 50–60 min, depending on the treatment; leaving early when finished with bargaining quickly was not possible. Subjects' total earnings were converted into cash with an exchange rate of 100 points equal to 40 Turkish Lira Cents. The average earning per subject was approximately 40 Turkish Lira (including a show-up fee of 5 Turkish Lira), which corresponds to the total amount a student would pay for seven days of lunch at the student cafeteria.

3.2 Research hypotheses

3.2.1 Frequency of (dis)agreements

Some earlier research on time pressure effects on bargaining showed that high time pressure induces lower resistance to conceding (see Roth et al. 1988; Lim and Murnighan 1994; De Dreu et al. 2000). This is due to the proximity to a deadline, making reaching an agreement more urgent. Hence, individuals under high time pressure might care less about their own position and are more willing to compromise. On the other hand, individuals under low time pressure care a lot about their own position or outcomes and are unwilling to concede to the other party (Druckman 1994). We think that there are also good arguments in favor of the opposite hypothesis–especially in the current setup. Given the presence of conflicting reference/focal points (and if the initial tension is identical across treatments), it could become more difficult to reach an agreement (see also Yukl et al. 1976; Carnevale and Lawler

[5] The LTP data used here is also used in Gächter et al. (2015).

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

1986; Mosterd and Rutte 2000). It is also likely that tension in first proposals will be more influential for the likelihood of disagreements under severe time pressure. We predict that in HTP, we observe more frequent disagreements (see also Roth et al. 1988).

Hypothesis 1 The frequency of disagreements is higher in HTP than in LTP.

3.2.2 Content of agreements

In our experiment, there are two potential reference/focal points. The 2/3-1/3 division is the one explicitly induced by the experimental design, and the 1/2-1/2 division is the one implicitly present due to vagueness of the reasons in favor of 2/3-1/3 and due to the equality norm. It has been pointed out in the literature that individuals often rely on cognitive heuristics, which could have evolved with the objective of increasing efficiency and speed while they may decrease accuracy and quality (Bazerman and Neale 1983; Carnevale and Pruitt 1992). We stipulate that greater time pressure increases the need for straightforwardly available coordinating devices and reliance on focal/reference points. The induced reference point, the 2/3-1/3 distribution—being more favorable to high performers—can act as such a coordinating device. The implicit reference point, the 1/2-1/2 distribution—being relatively more favorable to low performers—can also act as a coordinating device. However, the former has the advantage of explicitness and salience induced by our design. We predict that (due to the greater salience of the 2/3-1/3 distribution as a reference point or focal point) time pressure favors high performers.

Hypothesis 2 2/3-1/3 agreements are more likely in HTP than in LTP, and 1/2-1/2 agreements are less likely in HTP than in LTP, both conditional on an agreement being reached.

Hypothesis 3 Average agreed shares of high performers are larger in HTP than in LTP.

3.2.3 Timing of agreements

For reasons similar to the ones discussed above (for disagreements), we hypothesize that time pressure will increase the frequency of last-moment agreements. In other words, the deadline effect will be more pronounced in HTP.

Hypothesis 4 The frequency of last-moment agreements is higher in HTP than in LTP.

A point worthwhile mentioning is that a higher level of time pressure itself does not necessarily imply more frequent last-moment agreements. It could simply change the way bargainers perceive risks associated with breakdown and lead them to rush for deals. We do not provide a hypothesis for the stake-size variation (i.e.,

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

the increase or decrease in budget and the subsequent feasibility or infeasibility of historical claims according to the story in our experimental instructions), because it was not a variable of interest to us.[6] Nonetheless, we report results regarding this variable in the results section and the Online Appendix.

4 Experimental results

Whenever we have a one-sided hypothesis, we use one-sided test statistics. When comparing means across treatments, we use Mann–Whitney-U (MW) tests, and in comparing distributions of variables, we use Kolmogorov–Smirnov (KS) tests. When comparing ratios (or percentages), we use both Pearson's Chi square and Fisher's exact tests. For reasons of convenience, we label high performing department heads as "winners" and low performing department heads as "losers". Fairness judgments, first proposals, and agreements are all given in shares to winners.[7] We defer non-parametric tests related to differences in bargaining behavior (or outcomes) across different stake sizes to the Online Appendix (see Online Appendix A.3, Table A.3.5). Those results show that the main outcome variables of bargaining are not systematically influenced by the variation in the stake size. Hence, in conducting the non-parametric tests below, we pool data from the two stake sizes.[8]

For every regression analysis, we present four specifications: (1) only the main variables of interest as independent variables (Specification 1), (2) Specification 1 + control variables (Specification 2), (3) Specification 1 + interaction variables (Specification 3), and (4) Specification 3 + control variables (Specification 4). Control variables are subjects' justice centrality scores, agreeableness scores, risk attitudes, gender composition of the pair, and the budget level dummy (1 for the higher budget). In the following, we provide the estimates for our main variables of interest. Detailed regression tables are provided in Online Appendix A.3, and we report marginal treatment effects from our regressions in Table A.3.6.[9]

4.1 Frequency of (dis)agreements

Table 2 shows the distribution of disagreements in our treatments. We observe that 4 pairs (out of 89; 4.5%) disagreed in LTP, and 22 pairs (out of 70; 31.4%) disagreed in HTP. Both tests show that the difference is highly significant (for both, $p < 0.001$), strongly in line with Hypothesis 1.

[6] See footenote 5. Gächter et al. (2015) study the effects of the stake-size variation.

[7] For instance, if a loser asks for 55% of the pie in his first proposal, this implies that he offers 45% to the winner. Hence, the variable "shares to winner" is given as 45%. Similarly, if a loser believes that he deserves 48% of the pie, we present it in shares to the winner, i.e., as 52%.

[8] In contrast, stake size is explicitly controlled for in the regression analyses. In the regression analysis the stake size variation has an influence on two bargaining markers: higher stake is associated with less frequent 2/3-1/3 agreements and more frequent last-moment agreements.

[9] In Sect. 4.3, we also present auxiliary results on the bargaining process.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 2 Disagreements and time pressure

Disagreements	LTP	HTP	Total
0	85	48	133
1	4	22	26
Total	89	70	159

Table 3 Disagreements and time pressure (robust probit)

	Dep. Var.: *Disagree* | = 1 if disagreement, = 0 otherwise			
Indep. Vars.	Specification 1	Specification 2	Specification 3	Specification 4
T_pressure	1.21*** (0.30)	1.43*** (0.29)	0.56 (0.50)	0.72* (0.54)
Diff_first (DF)	2.04** (1.03)	2.08* (1.33)	− 0.16 (1.74)	− 0.40 (1.70)
T_pressure * DF	–	–	3.34* (2.24)	3.57* (2.63)
Controls	No	Yes	No	Yes
Constant	− 2.08*** (0.37)	1.97 (1.66)	− 1.63*** (0.40)	2.70 (1.79)
# of Obs. = 148	Pseudo-R^2 = 0.17 Wald-$chi^2(2)$ = 16.36 Prob > chi^2 = 0.0003	Pseudo-R^2 = 0.30 Wald-$chi^2(10)$ = 44.33 Prob > chi^2 < 0.0001	Pseudo-R^2 = 0.18 Wald-$chi^2(3)$ = 20.96 Prob > chi^2 = 0.0001	Pseudo-R^2 = 0.31 Wald-$chi^2(11)$ = 47.45 Prob > chi^2 < 0.0001

*10%, **5%, ***1% significance. Robust standard errors in parentheses

Table 3 presents the results of (robust) probit regressions investigating the effects of time pressure (*T_pressure*), tension in first proposals (the difference in first proposals; *Diff_first*), and the interaction between the two variables on the probability of disagreements.[10] In all specifications, the time pressure coefficient has the expected positive sign, and it is significant, except for Specification 3. The interaction of time pressure and the tension in first proposals has the expected positive sign. We interpret this result as follows: for those pairs with high levels of tension in first proposals, the effect of time pressure on the likelihood of a disagreement is seems to be stronger, but the evidence is not fully conclusive.

Notice that there are only four disagreements in LTP (out of 89 pairs), and probit models can become unstable if the binary dependent variable takes one of the two values only very infrequently. Therefore, as a further sensitivity analysis, we also run an exact logistic regression with time pressure, a binary variable describing the tension in first proposals, and an interaction of these two as explanatory variables (see Table A.2.3 in the Online Appendix).[11] An exact logistic regression is recommended when the sample size is very small and/or when some of the cells formed

[10] It is worthwhile mentioning that potential endogeneity issues may exist in the analyses reported in Table 3. To see whether this is the case, we run endogeneity tests: the null hypothesis of no endogeneity is not rejected in either case (Wald test p-values for Specifications 1 and 3 in Table 3 are 0.99 and 0.55).

[11] The binary variable takes the value 1 for those bargaining pairs with tension in first proposals higher than the median and 0 otherwise. We converted the continuous variable *Diff_first* into the categorical variable *Binary_tension* due to computational problems caused by using the continuous one.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

by the dependent or independent categorical variables contain very few observations.[12] Estimation results reported in Table A.2.3 provide further support for our conclusions.

Result 1 Time pressure increases the frequency and likelihood of disagreements.

Result 2 The effect of time pressure seems to be stronger for those pairs with high levels of tension between players' first proposals.

4.2 Content of agreements

Figure A.1.1 in the Online Appendix shows that high performers' subjective entitlements are (on average) 0.66 (in both treatments), directly coinciding with the induced reference point. In contrast, low performers' subjective entitlements (on average) are around 0.58, the midpoint between 1/2-1/2 and 2/3-1/3. Figure A.1.2 shows that high-performers' first offers bunch around 2/3-1/3 (mean = 0.69, median = 0.67) and low-performers' first offers bunch around 1/2-1/2 (mean = 0.50, median = 0.53). Moreover, 28% of a total of 363 offers in HTP are equal to either exactly 2/3-1/3 or to the closest prominent numbers around 2/3-1/3 (i.e. the 17,000-10,000 division of the 27,000 budget), and 17% are equal either exactly to 1/2-1/2 or to the closest prominent/round numbers around 1/2-1/2 (i.e., the 8,000–7000 division of 15,000 and the 14,000–13,000 division of 27,000). These percentages are 26 and 13% respectively for LTP (of a total of 1032 offers). Subjects' fairness judgments (or entitlement perceptions), first proposals, and the rest of the bargaining process were all influenced by the two reference points.

Given these observations, our next look is at bargaining outcomes. The average agreed share of winners (conditional on agreement) is 0.59 in LTP and 0.60 in HTP (one-sided, MW, $p = 0.44$; KS, $p = 0.49$; see Fig. 1).[13] Understandably, these numbers constitute compromises between players' first proposals (i.e., 0.50 and 0.69), replicating findings from studies with similar designs. In fact, the shares happen to be at the midpoint of the range of first offers. Moreover, 103 out of 133 (77%) agreements were in this range (0.50–0.69). On average, time pressure does not have a *level* effect on agreement terms. Even a less ambitious test, where we check whether agreements close to 2/3-1/3 are more frequent in HTP does not give a statistically significant affirmative answer: 73% (65%) of all agreements in HTP (LTP) are closer to 2/3-1/3, but Fisher's exact and Pearson's Chi square tests both reject the notion that the difference is significant (one-sided, $p = 0.219$ and 0.331).

Result 3 Conditional on agreements, neither the average winner agreed share nor the distribution of winner agreed shares differ between LTP and HTP.

[12] See http://www.ats.ucla.edu/stat/stata/dae/exlogit.htm for further details.

[13] A natural question is whether there is a difference between the agreements across treatments if one restricts attention to last-moment (last five seconds) agreements. The mean winner agreed share in such agreements is 0.60 in HTP and 0.61 in LTP (two-sided, MW, $p = 0.43$).

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

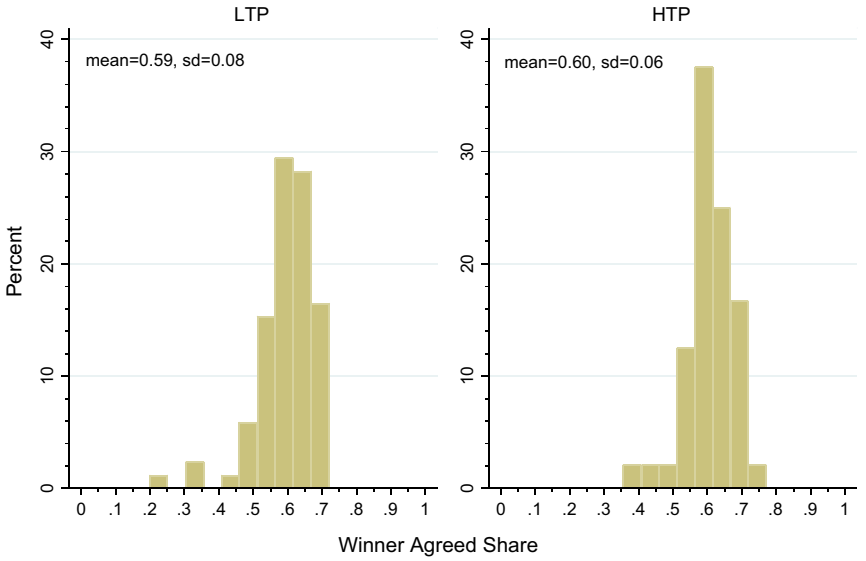


Fig. 1 Distribution of winner agreed shares in LTP and HTP

Table 4 presents the results of (robust) seemingly unrelated bi-probit regressions, investigating the effects of time pressure, winner entitlements, loser entitlements, interaction variables, and control variables on the probability of reaching 2/3-1/3 agreements and 1/2-1/2 agreements (conditional on agreement), whereas Table 5 presents a (robust) OLS regression on winners' agreed shares.[14] In the tables, *T_pressure* is a dummy variable taking a value 0 for LTP and 1 for HTP; *W_fair* and *L_fair* denote winner and loser entitlements, respectively (in the share going to the winner) – the two are taken from the question regarding the allocation choice of a fair and neutral arbitrator.

In Table 4 (upper panel), Model 1, where the dependent variable is a dummy (i.e., *Statusquo*) showing whether the agreement reached is the 2/3-1/3 division or not, the coefficient of T_pressure is positive in all specifications, but significant on convention levels only in Specifications 3 and 4. This implies that HTP per se does not increase the probability of reaching 2/3-1/3 agreements. In Model 2 (lower panel of Table 4), where the dependent variable is a dummy (i.e., *Equal*) showing whether the agreement reached is the 1/2-1/2 division, we see that the coefficient of T_pressure is significant and negative in all specifications. The results imply that HTP decreased the probability of reaching 1/2-1/2 agreements.

[14] Since whether to agree on 2/3-1/3 division or on 1/2-1/2 divison are decisions likely not to be independent, we ran a seemingly unrelated bi-probit regression rather than two separate probit regressions. Results from univariate probit regression models are given in the Online Appendix A.2. In short, the two sets of results produce very similar results.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 4 2/3-1/3 and 1/2-1/2 agreements with time pressure (SU robust bi-probit)

Model 1. Depend. Var.: *Statusquo* | = 1 if 2/3-1/3 agreement, = 0 otherwise				
Indep. Vars.	Specification 1	Specification 2	Specification 3	Specification 4
T_pressure	0.06 (0.30)	0.12 (0.31)	8.40** (4.37)	9.96** (4.60)
W_fair	5.50*** (2.13)	5.66*** (2.15)	6.75** (3.47)	6.72** (3.36)
L_fair	1.79 (2.39)	1.59 (2.27)	8.29*** (3.18)	9.38*** (3.49)
T_pressure*W_fair	–	–	− 1.48 (5.05)	− 1.26 (4.93)
T_pressure*L_fair	–	–	− 12.64*** (4.49)	− 15.51*** (4.79)
Controls	No	Yes	No	Yes
Constant	− 5.81*** (2.10)	− 7.13*** (2.54)	− 10.46*** (3.74)	− 13.51*** (4.43)
Model 2. Depend. Var.: Equal | = 1 if 1/2-1/2 agreement, = 0 otherwise				
Indep. Vars.	Specification 1	Specification 2	Specification 3	Specification 4
T_pressure	− 0.61* (0.42)	− 1.13*** (0.45)	− 19.97** (10.98)	− 17.83** (10.02)
W_fair	2.24 (2.31)	0.17 (3.96)	− 0.25 (1.96)	− 1.40 (3.97)
L_fair	4.68 (3.84)	4.73 (4.87)	2.48 (3.97)	3.41 (5.09)
T_pressure*W_fair	–	–	9.57 (5.97)	9.85 (6.76)
T_pressure*L_fair	–	–	19.73* (11.89)	15.41 (11.84)
Controls	No	Yes	No	Yes
Constant	− 5.84** (2.86)	− 1.98 (2.98)	− 2.94 (2.34)	− 0.55 (3.25)
# of Obs. = 133	Wald-chi^2(6) = 15.06 Prob > chi^2 = 0.0198	Wald-chi^2(22) = 55.18 Prob > chi^2 = 0.0001	Wald-chi^2(10) = 16.17 Prob > chi^2 = 0.095	Wald-chi^2(26) = 59.40 Prob > chi^2 = 0.0002

*10%, **5%, ***1% significance. Robust standard errors in parentheses

Table 5 Agreements and time pressure (Robust OLS)

Indep. Vars.	Dep. Var.: *W_agreedshare* | winner's share in the agreement			
	Specification 1	Specification 2	Specification 3	Specification 4
T_pressure	0.001 (0.12)	0.01 (0.01)	0.29** (0.12)	0.35*** (0.13)
W_fair	0.28*** (0.06)	0.28*** (0.07)	0.36*** (0.08)	0.37*** (0.08)
L_fair	0.10 (0.08)	0.09 (0.08)	0.18** (0.10)	0.19*** (0.10)
T_pressure*W_fair	–	–	− 0.26** (0.12)	− 0.30** (0.12)
T_pressure*L_fair	–	–	− 0.20 (0.16)	− 0.25 (0.17)
Controls	No	Yes	No	Yes
Constant	0.35*** (0.06)	0.35*** (0.10)	0.25*** (0.08)	0.22** (0.11)
# of Obs. = 133	F(3, 129) = 7.40 Prob > F = 0.0001 R^2 = 0.08	F(3, 129) = 3.08 Prob > F = 0.0011 R^2 = 0.11	F(5, 127) = 5.51 Prob > F = 0.0001 R^2 = 0.10	F(13, 119) = 3.24 Prob > F = 0.0003 R^2 = 0.14

*10%, **5%, ***1% significance. Robust standard errors in parentheses

Result 4 Conditional on agreements, time pressure decreases the likelihood of reaching agreements on the implicit reference point, i.e., the 1/2-1/2 division. However, it does not systematically relate to the likelihood of 2/3-1/3 agreements.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 5 presents the results of (robust) OLS regressions investigating the effects of time pressure, winner entitlements, loser entitlements, and interaction variables on winners' agreed shares, conditional on agreements. We observe that the coefficients of both winners' and losers' fairness judgments have the expected positive sign in all four specifications. *W_fair* is highly significant in all specifications, whereas *L_fair* is only significant in Specifications 3 and 4. The coefficient of time pressure is positive in all specifications but, again, only significant in Specifications 3 and 4. Thus, winners' agreed shares appear to be unaffected by the variation in time pressure, as already indicated by our non-parametric analysis.

Result 5 Conditional on agreements, time pressure does not influence the share winners receive in agreements. The influence of subjects' fairness judgments (or perceived entitlements) on agreements is weaker under time pressure.

4.3 The bargaining process and the timing of agreements

4.3.1 Bargaining process

Since our participants know the deadline before they make their first proposals, the latter might have been influenced by the variation in the bargaining deadline, affecting the tension in first proposals. However, the distributions of tension in first proposals (measured in percentage points; i.e., 0.17 means that the sum of what bargainers demand in their first proposals corresponds to 117% of the pie) in LTP and HTP do not present evidence for a difference in the tension between first proposals (0.19 for LTP and 0.17 for HTP; two-sided MW, $p=0.40$; KS, $p=0.61$).

First proposals are also potentially informative since *impasse* may start with a specific constellation of initial positions. Figure A.2 in the Online Appendix depicts the distribution of winners' and losers' first proposals across treatments. It shows that the induced reference point outcome, that is the 2/3-1/3 division, is utilized by high performers, whereas the implicit reference point outcome, that is the 1/2-1/2 division, is utilized by low performers in making a first proposal. This is in line with Roth's (1985) argument: "[The] bargainers sought to identify initial bargaining positions that had some special reason for being credible, and that these credible bargaining positions then served as *focal points* that influenced the subsequent conduct of negotiations [italics in original]." Since 2/3-1/3 and 1/2-1/2 are possibly the two most salient (or credible) reference/focal points in our environment, it is natural to observe that they influence subjects' initial bargaining positions.

It is worthwhile re-emphasizing that the differences that we observe in disagreement rates (reported in Sect. 4.1) between LTP and HTP are not due to a prohibitively high level of time pressure. As we reported above, the tension in first proposals (a variable describing an important layer of bargaining) is identical across treatments. The frequency of winners (losers) making the opening proposal in a pair (i.e., the very first offer in a pair) and the frequency of winners (losers) accepting an offer in a pair is also the same in the two treatments (Fisher's exact tests; p-values are 0.71 and 0.56 for winners, and 0.78 and 0.56 for losers). Moreover, the average

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

number of proposals made in a pair is 11.5 in LTP and 5.2 in HTP. Despite the 85% reduction in allotted time (i.e. from 600 to 90 s) the number of proposals dropped by only 54%. In other words, bargainers in our HTP treatment still found time to exchange *several* proposals.

A look at the distribution of concessions shows that concession behavior looks very similar in LTP and HTP. MW tests show that average concessions, defined as the difference between what a subject has asked for herself in her first proposal and what she agreed to receive at the end (excluding disagreements), are identical across LTP and HTP (two-sided, $p=0.29$ for winners, $p=0.14$ for losers). KS tests deliver the same conclusion (two-sided, $p=0.57$ for winners, $p=0.54$ for losers).

4.3.2 Timing of agreements

The average agreement time in LTP (395 s) is 65.8% of the allotted time (600 s), whereas the average agreement time in HTP (78 s) is 86.7% of the allotted time (90 s). Table 6 displays the distribution of agreement times (in relation to the total time allotted) in LTP and HTP.[15] Numbers in the top row refer to the time intervals in percentiles (e.g., first 10% of the allotted time and so on), and the numbers in the second and third rows refer to the percentage of agreements that occurred in the corresponding time interval. These numbers show that the distribution of (relative) agreement times in HTP first-order stochastically dominates the ones in LTP. 41% of all agreements in LTP are reached in the last 10% of the allotted time (i.e., between seconds 541 and 600), whereas 72.90% of all agreements in HTP are reached in the last 10% of the allotted time (i.e., between seconds 81 and 90).

Table 7 shows the distribution of last-moment agreements (defined as agreements reached in the last 5 s before the deadline), both conditional and unconditional on reaching an agreement, across treatments. In the latter, a disagreement is coded as 0 (i.e., not a last-moment agreement). We observe that 26 pairs (out of 85 that reached an agreement; 30.5%) in LTP reach the agreement in the last five seconds, and 24 pairs (out of 48 that reached an agreement; 50%) in HTP reach the agreement in the last 5 s. Both Pearson's Chi square and Fisher's exact tests show that the difference is significant, in line with Hypothesis 4.

That said, there is another possible definition of last-moment agreements. As it can also be seen in Table 7, if one does not take disagreements into account, then the percentage of last-moment agreements in LTP is 29.2 and in HTP it is 34.3. The difference is in the same direction, but not significant (Pearson's Chi square test, $p=0.49$, one-sided Fisher's Exact test, $p=0.30$).

Result 6 Conditional on agreements, the frequency of last-moment agreements is higher in HTP than in LTP. Including disagreements in the analysis does not change the direction of this result, but renders it statistically insignificant.

[15] We also study agreement times in absolute terms, i.e., not as percentages of the allotted time. Figure A.1.3 and A.1.4, where we do this, deliver the same message.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 6 Distribution of agreement times in LTP and HTP

Time brackets in % of total time	0–10	11–20	21–30	31–40	41–50	51–60	61–70	71–80	81–90	91–100
% of agreements in bracket, LTP	5.90	7.00	9.40	9.40	4.70	4.70	5.90	7.00	4.70	41.00
% of agreements in bracket, HTP	0.00	2.08	4.17	0.00	2.08	4.17	2.08	6.25	6.25	72.90

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Table 7 Last-moment agreements and time pressure

Conditional on agreement	LTP	HTP	Total	Unconditional on agreement	LTP	HTP	Total
0	59	24	83	0	63	46	109
1	26	24	50	1	26	24	50
Total	85	48	133	Total	89	70	159
Pearson's Chi square test = 0.03 One-sided Fisher's Exact Test = 0.02				Pearson's Chi square test = 0.49 One-sided Fisher's Exact Test = 0.30			

Table 8 Last-moment agreements and time pressure (robust probit)

Indep. Vars.	Dep. Var.: *Last_moment* | = 1 if agreed in the last 5 s, = 0 otherwise			
	Specification 1	Specification 2	Specification 3	Specification 4
T_pressure	0.62*** (0.26)	0.59** (0.27)	0.84** (0.49)	0.87** (0.53)
Diff_first (DF)	3.19*** (1.24)	3.63*** (1.39)	3.61*** (1.38)	4.11*** (1.53)
T_pressure * DF	–	–	− 1.31 (2.77)	− 1.64 (3.04)
Controls	No	Yes	No	Yes
Constant	− 1.08*** (0.28)	− 2.23 (1.52)	− 1.16*** (0.30)	− 2.41 (1.62)
# of Obs. = 124	Wald-chi^2(2) = 9.53 Prob > chi^2 = 0.00085 Pseudo-R^2 = 0.08	Wald-chi^2(10) = 18.54 Prob > chi^2 = 0.0465 Pseudo-R^2 = 0.15	Wald-chi^2(3) = = 11.72 Prob > chi^2 = 0.0084 Pseudo-R^2 = 0.08	Wald-chi^2(11) = 20.39 Prob > chi^2 = 0.0402 Pseudo-R^2 = 0.15

*10%, **5%, ***1% significance. Robust standard errors in parentheses

# of obs. is 124 because Diff_first is not defined for 9 pairs where only one subject made an offer and it was accepted

Combined with our findings on first proposals and initial tensions, the similarity of concession behavior across treatments hints at the increased disagreement rate and last-moment agreement frequency under HTP: if average initial conflict and concession behavior are very similar across two situations, but the negotiators have only 90 s to strike a deal instead of 10 min, naturally it is likely that they end up in stalemates (or reach an agreement in the very last moment).

Table 8 presents the results of (robust) probit regressions, investigating the effects of time pressure, tension in first proposals, and the interaction between the two on the probability of last-moment agreements (i.e. agreements reached in the last 5 s), conditional on agreements.[16] In all specifications, the coefficients of time pressure and the tension in first proposals are highly significant and have the expected positive signs.[17]

[16] We also checked for possible endogeneity issues in this analysis. The null hypothesis of no endogeneity is not rejected in either case. Corresponding Wald test p-values for Specifications 1 and 3 in Table 8 are 0.22 and 0.15.

[17] The marginal effect of T_pressure is calculated as 0.28, which is significant at the 5% level (see Table A.3.6 in the Online Appendix).

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Result 7 Conditional on agreements, time pressure increases the likelihood of last-moment agreements.

5 Discussion and conclusion

Time pressure and deadlines are important characteristics of many bargaining situations. To fully understand their impact on bargaining processes and bargaining outcomes it is important to analyze a bargaining situation that is both rich enough in context and structured enough to obtain relevant measures from the process of bargaining. Until now, a study on the effects of deadlines in a rich bargaining context was not available in economics. Our setup extends existing results on the effects of deadlines and time pressure in structured bargaining games such as the ultimatum game.

Our experiment provides a set of relevant results and implications. First, disagreement rates are much higher under high time pressure than under low time pressure. The corresponding figures are 31.4 and 4.5%, respectively. The robustness check in the form of our treatment with severely high time pressure confirms the general tendency (38%). Obviously, bargaining becomes much more inefficient under high time pressure than under low time pressure. This change is not due to physical impossibility of making proposals, i.e. offers and counter-offers. Finally, the influence of time pressure (on the likelihood of disagreements) seems to be stronger for those pairs with higher levels of tension in first proposals. Conditional on reaching an agreement, the *deadline effect* is much more pronounced under high time pressure (50% of agreements are reached in the last 5 s) than under low time pressure (31% of agreements are reached in the last 5 s). Both non-parametric tests and regression analyses provide the same message: time pressure increases the likelihood (or frequency) of last-moment agreements, conditional on agreement. That said, if one includes disagreements in the analysis, the difference becomes insignificant.

Our preferred interpretation of the stark difference in the frequency of disagreements across treatments runs as follows: in a game with multiple equilibria such as ours, the need for coordination devices is stronger under higher time pressure. Our setup generates competing coordination devices. Given that winners start bargaining with a first offer slightly above 2/3-1/3 and losers start with a first offer of 1/2-1/2, and they do not concede faster or more often under high time pressure (compared to low time pressure), it is obvious that disproportionately more of them end up in bargaining stalemates. One may argue that we implemented a one-shot bargaining problem without any repetition. Bargainers in the high time pressure treatment might have underestimated the time required to avoid ultimate conflict and reach an agreement, which led to the high disagreement rate. Hence, a question for future work is whether the effect we observe survives a repeated design version. It would not be too surprising if it turned out that the time pressure effect was strongest when subjects are least experienced with bargaining.

Second, the bargaining outcomes in terms of agreements do not differ much between different time pressure conditions. However, we observe a lower frequency of the 1/2-1/2 agreements under time pressure, i.e. time pressure seems to dis-favor the implicit

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

reference point. Observing that under severely high time pressure (i.e., 45 s), average winners' share in agreements is 62% raises the possibility that even more severe time pressure may increase the popularity of the explicit reference point—a conjecture that needs to be tested in future research. We do not want to over-interpret our result, given that we only obtain a significant result for the implicit reference point and not for the explicit reference point, but our findings seem to be in line with a stronger status quo bias under time pressure. The explicit reference might be more salient than the implicit reference point when time is scarce to think about other potential reference points. It is relevant to notice that the literature on the effects of time pressure on choosing more egoistic or the more altruistic allocations, which is related, is also not fully conclusive.

Third, it is interesting to observe that the nature of the communication, especially the content of the chat (see the Online Appendix for details), is very similar across different time pressure conditions. Also, first proposals and the concession behavior do not differ significantly.

Our experimental results question the *somewhat* positive interpretation of time pressure in bargaining from social psychology and negotiation science. We show that time pressure in bargaining, even if it is not extremely severe, can have huge effects on the efficiency of negotiation outcomes. Setting too ambitious deadlines – especially in the presence of competing reference or focal points – might thus be dangerous in real-world negotiations. Furthermore, our results show that time pressure due to tight deadlines may have distributive implications in that they appear to slightly benefit the party who is more favored by the precedent. Naturally, there are still open questions that call for future research: What if we had varied the salience of different reference points by design? Would cognitive load, another aspect that makes decision making harder similar to time pressure, lead to comparable results to ours? What would be the *optimal* deadline given the characteristics of the bargaining situation? Ultimately, our results and the results from future research have the potential to contribute to a theory of bargaining that takes time and thus deadlines explicitly into account.

Acknowledgements Open access funding provided by University of Vienna. Emin Karagözoğlu acknowledges financial support (grant #111K499) from The Scientific and Technological Research Council of Turkey (TÜBİTAK) and The Science Academy of Turkey (Bilim Akademisi) as well as an Erasmus+ Mobility Grant from the European Union. Martin Kocher acknowledges financial support from the Deutsche Forschungsgemeinschaft through CRC TRR 190 and from the Center for Advanced Studies at the Ludwig-Maximilians-University of Munich. We would like to thank Marie-Claire Villeval as the responsible editor and two anonymous referees, whose constructive comments improved the paper a lot. We would also like to thank Gary Bolton, Jared Curhan, Matthew Embrey, Anita Gantner, Sergiu Hart, Kyle Hyndman, Doron Kliger, Anders Poulsen, and Eyal Winter for their useful comments, and the audiences at seminars in Bilkent University, Boğaziçi University, Carnegie Mellon University, Harvard Business School, Hebrew University of Jerusalem, University of Haifa, İstanbul Bilgi University, Middle East Technical University, Özyeğin University, and Yaşar University. We are grateful to Betül Akar, Kerim Keskin, and Naime Geredeli Usul for excellent research assistance. The usual disclaimers apply.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

References

Alberti, F., Fischer, S., Güth, W., & Tsutsui, K. (2017). Concession bargaining: An experimental comparison of protocols and time horizons. *Journal of Conflict Resolution*. https://doi.org/10.1177/0022002717720753.

Babcock, L., Loewenstein, G., Issacharoff, S., & Camerer, C. (1995). Biased judgments of fairness in bargaining. *American Economic Review, 85,* 1337–1343.

Bazerman, M., & Neale, M. (1983). Heuristics in negotiation: Limitations to dispute resolution effectiveness. In M. H. Bazerman & R. Lewicki (Eds.), *Negotiations in organizations*. Beverly Hills, CA: Sage.

Bolton, G. E., & Karagözoğlu, E. (2016). On the influence of hard leverage in a soft leverage bargaining game: The importance of credible claims. *Games and Economic Behavior, 99,* 164–179.

Brams, S. J., & Taylor, A. D. (1994). Divide the dollar: Three solutions and extensions. *Theory and Decision, 37,* 211–231.

Bulow, J. I. and Klemperer, P. (1999) The Tobacco Deal. *CEPR DP# 2125*.

Camerer, C., Nave, G., & Smith, A. (2017). *Dynamic unstructured bargaining with private information: Theory, experiment, and outcome prediction via machine learning*. Caltech Working Paper.

Cappelletti, D., Güth, W., & Ploner, M. (2011). Being of two minds: Ultimatum offers under cognitive constraints. *Journal of Economic Psychology, 32,* 940–950.

Carnevale, P. J. D., & Lawler, E. J. (1986). Time pressure and the development of integrative agreements in bilateral negotiations. *Journal of Conflict Resolution, 30,* 636–659.

Carnevale, P. J. D., & Pruitt, D. G. (1992). Negotiation and mediation. *Annual Review of Psychology, 43,* 531–582.

Cetemen, E. D., & Karagözoğlu, E. (2014). Implementing equal division with an ultimatum threat. *Theory and Decision, 77,* 223–236.

Dalbert, C., Montada, L., & Schmitt, M. (1987). Glaube an eine gerechte Welt als Motiv: Validierungskorrelate zweier Skalen. *Pschologische Beiträge, 29,* 596–615.

Damiano, E., Li, H., & Suen, W. (2012). Optimal deadlines for agreements. *Theoretical Economics, 7,* 357–393.

De Dreu, C. K. W. (2003). Time pressure and closing of the mind in negotiations. *Organizational Behavior and Human Decision Processes, 91,* 280–295.

De Dreu, C., Weingart, R., & Kwon, S. (2000). Influence of social motives on integrative negotiation: A meta-analytic review and test of two theories. *Journal of Personality and Social Psychology, 78,* 889–905.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association, 3,* 522–550.

Druckman, D. (1994). Determinants of compromising behavior in negotiation: A meta-analysis. *Journal of Conflict Resolution, 15,* 523–555.

Fanning, J. (2016). Reputational Bargaining and Deadlines. *Econometrica, 84,* 1131–1179.

Fershtman, C., & Seidmann, D. (1993). Deadline effects and inefficient delay in bargaining with endogenous commitment. *Journal of Economic Theory, 60,* 306–321.

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics, 20,* 171–178.

Fuchs, W., & Skrzypacz, A. (2013). Bargaining with deadlines and private information. *American Economic Journal: Microeconomics, 5,* 219–243.

Gächter, S., Karagözoğlu, E., & Riedl, A. (2015). When the going gets tough or easy in bargaining. *Mimeo*.

Gächter, S., & Riedl, A. (2005). Moral property rights in bargaining with infeasible claims. *Management Science, 51,* 249–263.

Gino, F., & Moore, D. (2008). Using final deadlines in negotiation strategically. *Negotiation and Conflict Management Research, 1,* 371–388.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality, 37,* 504–528.

Güth, W., Levati, M. V., & Maciejovksy, B. (2005). Deadline effects in sequential bargaining: An experimental study. *International Game Theory Review, 7*, 117–135.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press

Harinck, F., & De Dreu, C. K. W. (2004). Negotiating interests or values and reaching integrative agreements: The importance of time pressure and temporary impasses. *European Journal of Social Psychology, 34,* 595–611.

Karagözoğlu, E., & Keskin, K. (2018). Time-varying fairness concerns, delay and disagreement in bargaining. *Journal of Economic Behavior and Organization*. https://doi.org/10.1016/j.jebo.2018.01.002.

Karagözoğlu, E., & Riedl, A. (2015). Performance information, production uncertainty, and subjective entitlements in bargaining. *Management Science, 61,* 2611–2626.

Lim, S. A., & Murnighan, K. J. (1994). Phases, deadlines, and the bargaining process. *Organizational Behavior and Human Decision Processes, 58,* 153–171.

Ma, C. A., & Manove, M. (1993). Bargaining with deadlines and imperfect player control. *Econometrica, 61,* 1313–1339.

Moore, D. (2004). The unexpected benefits of final deadlines in negotiation. *Journal of Experimental Social Psychology, 40,* 121–127.

Mosterd, I., & Rutte, C. G. (2000). Effects of time pressure and accountability to constituents on negotiation. *International Journal of Conflict Management, 1,* 227–247.

Nash, J. (1953). Two-person cooperative games. *Econometrica, 21,* 128–140.

Ponsati, C. (1995). The deadline effect: A theoretical note. *Economics Letters, 48,* 281–285.

Roth, A. E. (1985). Toward a focal-point theory of bargaining. In A. E. Roth (Ed.), *Game-theoretic models of bargaining* (pp. 259–268). Cambridge: Cambridge University Press.

Roth, A. E., Murnighan, J. K., & Schoumaker, F. (1988). The deadline effect in bargaining: Some experimental evidence. *American Economic Review, 78,* 806–823.

Rubinstein, A. (1982). Perfect equilibrium in a bargaining model. *Econometrica, 50,* 97–109.

Şimşek, A. & Yıldız, M. (2014). Durability, deadline, and election effects in bargaining. Unpublished manuscript.

Spiliopoulos, L., & Ortmann, A. (2014). *The BCD of response time analysis in experimental economics.* Working Paper*, SSRN*.

Stuhlmacher, A. F., Gillespie, T. L., & Champagne, M. V. (1998). The impact of time pressure in negotiation: A meta-analysis. *International Journal of Conflict Management, 9,* 97–116.

Sutter, M., Kocher, M., & Strauss, S. (2003). Bargaining under time pressure in an ultimatum game. *Economics Letters, 81,* 341–347.

Yukl, G. A., Malone, M. P., Hayslip, B., & Pamin, T. A. (1976). The effects of time pressure and issue settlement order on integrative bargaining. *Sociometry, 39,* 277–281.

https://doi.org/10.1007/s10683-018-9579-y Published online by Cambridge University Press