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Costs of implementation: Bargaining costs versus allocative efficiency

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ABSTRACT

A mechanism with low direct cost of use may be preferred to alternatives implementing more efficient allocations. We show this experimentally by giving pairs of subjects the option to agree on a single average price for a sequence of trades—in effect pooling several small bargains into a larger one. We make pooling costly by tying it to some inefficient trades, but subjects nevertheless reveal strong tendencies to pool, particularly when more bargains remain to be struck and when bargaining is face to face. The results suggest that implementation costs could play a significant role in the use of many common trading practices.

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1. Introduction

The original literature on comparative economic systems evaluates mechanisms in terms of their ability to implement efficient allocations as well as the costs of required activities, such as information gathering, communication, and bargaining (e.g., Hayek, 1945; Hurwicz, 1959). Yet, the latter class of costs plays almost no role in modern thinking on mechanism and market design. Challenging this practice, we provide experimental evidence, showing that players trade-off efficiency for costs by accepting less efficient allocations in exchange for fewer rounds of bargaining.

In our studies, subjects have the option to agree on a single average price for a sequence of small trades—in effect pooling several bargains into one. The experiments impose no artificial bargaining costs; subjects' only gain from pooling is to reduce the amount of bargaining they have to do. In spite of this, many pairs of subjects agree to pool, even at the cost of completing some inefficient trades. The tendency to pool is stronger when the associated allocative inefficiencies are smaller, when more rounds of bargaining are "saved", and when bargaining is face-to-face. Agreements on pooling prices are preceded by a larger number of offers and counter-offers than agreements on individual prices. Part of this is due to the fact that pairs who eventually choose to pool make more offers than pairs who never pool, even when negotiating individual prices.

Beyond suggesting that bargaining costs are positive, a more specific implication of our results is that these costs are sub-additive (since subjects prefer to bargain over a single pooled price rather than over a sequence of individual prices).

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Sub-additivity has strong intuitive appeal and is consistent with the sense that most people would prefer to negotiate a single $300 deal instead of thirty $10 deals.

Sub-additive bargaining costs are to bargaining what menu costs (Levy et al., 1997; Mankiw, 1985; Zbaracki et al., 2004) are to posted prices: they can help us explain incomplete price-adjustment. While this phenomenon has been largely ignored by economists, the US Supreme Court has defended it as rational responses to sub-additive pricing costs (Broadcast Music Inc. vs. Columbia Broadcast System, 1978). The American Society of Composers, Authors and Publishers, which license the work of individual artists in the music industry, charges a blanket fee to bars, radio stations, etc. When the Columbia Broadcast System challenged this practice, the court found in favor of the defendant, arguing "...a blanket license was an obvious necessity if the thousands of individual negotiations, a virtual impossibility, were to be avoided". Wernerfelt (1997) used similar arguments to explain the absence of ongoing bargaining between employees and their bosses. Our experiments speak directly to this by testing the extent to which subjects are willing to forego surplus in order to avoid ongoing bargaining.[1]

The remainder of the paper is organized as follows: we present a reduced form model in Section 2, the experimental design in Section 3, and the results in Section 4. The paper closes with a brief discussion in Section 5. The experimental instructions can be found in Appendix B along with a possible micro-foundation for the model and some more detailed data.

2. A reduced form model

To demonstrate the existence and sub-additivity of bargaining costs, we will derive some general conditions under which bargainers will prefer to pool a set of bargains. To keep the exposition as simple as possible, we will use a reduced form model of sequential bargaining. A possible foundation for this reduced form is analyzed in Appendix I (Ochs and Roth, 1989; Abreu and Gul, 2000; Abreu and Pearce, 2007; Yildiz, 2004; Siegel and Fouraker, 1960).

We index a particular game by $n = 1, 2, \ldots N$, where N is the total number of games the subjects can play. The seller's costs c_n and the buyer's valuation v_n are I.I.D. draws from two differentiable distributions, F_c and F_v, respectively. Expected gains from trade are $G = \int\int (v - c)\, dF_v dF_c$, and the expected magnitude of positive gains from trade is $G_+ = \int\int_{v>c} (v - c)\, dF_v dF_c$.

The analysis of the last game (game N) is straightforward. If the gains from trade are positive, both players have positive expected payoffs. Following the above, these payoffs sum to $v_N - c_N - b_N$, where $b_N \geq 0$ are bargaining costs. If the gains from trade are negative, the players will immediately agree not to trade and the payoffs sum to zero. Consider the next to last game under the assumption that the players engage in sequential bargaining. If gains from trade are positive, payoffs sum to $v_{N-1} - c_{N-1} - b_{N-1}$, where $b_{N-1} \geq 0$, and if the gains from trade are negative, payoffs sum to zero. Since contracting is sequential, the expected payoffs from the last two games are $v_{N-1} - c_{N-1} - b_{N-1} + G_+ - b_N$. Suppose instead the players decide to pool the last two games. The expected payoffs from the current game are $v_{N-1} - c_{N-1} - p_{N-1}$, where p_{N-1} are the bargaining costs associated with agreeing on the pooled contract. The sub-additivity of bargaining costs is captured by the assumption that $p_{N-1} \in (b_{N-1}, b_N + b_{N-1})$. Since pooling commits the players to trade in the last game, the expected payoffs from that are G. So pooling is preferable if

$$v_{N-1} - c_{N-1} - b_{N-1} + G_+ - \mathrm{b}_N \leq v_{N-1} - c_{N-1} - p_{N-1} + G \tag{1}$$

Given that bargaining costs are sub-additive, we can work backwards to see that pooling becomes less and less attractive as more periods go by. In sum (1) gives the following:

Proposition 1. *Pooling is more attractive when more bargaining costs are saved, when fewer inefficient trades are included, and when more periods remain.*

We test this proposition in a series of comparisons, involving six experimental treatments.

3. Experimental design

Two hundred and fifty-six students, 121 women and 135 males, aged 18–51 years ($M = 23.08$, SD = 4.13), participated in the experiment, which was conducted at the Computer Lab for Experimental Research (CLER) at Harvard Business School, the Behavioral Research Lab at the Massachusetts Institute of Technology, the University of Vienna, Austria, and the Max Planck Institute of Economics, Germany. Experimental sessions lasted between 40 and 50 min, and participants earned, on average, $15.72 (SD = 2.61), including a show-up fee of $10.

Upon arrival in the lab, subjects were randomly assigned to dyads. Within each dyad, one of the subjects was assigned the role of a buyer, the other the role of a seller. Participants bargained over fictitious commodities over several bargaining games via a computer interface (see details below).[2] Participants received written instructions (see Appendix II), and were asked to complete a short quiz that tested their understanding of the instructions. The experiment started only after all participants had answered all the quiz items correctly.

In order to be as conservative as possible, we do not impose any artificial bargaining costs, thereby allowing subjects to reveal their 'true' preferences. Several important classes of bargaining costs are thus absent, including inefficiencies resulting

[1] Surprisingly few other experimental papers explicitly address the theory of the firm, with Fehr et al. (Forthcoming) being the most prominent exception.
[2] See Camerer (2003) for an overview of experimental studies of bargaining.

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