Chapter 47

PREFERENCES AND PROPERTY RIGHTS IN ULTIMATUM AND DICTATOR GAMES

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1. Property Rights Defined

A property right is a guarantee allowing action within guidelines defined by the right. The guarantee is against reprisal, in that a property right places restrictions on punishment strategies that might otherwise be used to insure cooperative behavior. Property rights might be viewed as a means by which society legitimizes (makes "fair" or acceptable) the actions of a rights holder. Such rights are taken for granted in private ownership economies.

In bargaining games, such as the ultimatum game, the proposer may be less influenced by the norm of equality, and more inclined to pursue his or her strategic advantage, if endowed with a legitimate property right. Concurrently, subjects' expectations may be more compatible, and the counterpart less inclined to punish, if the proposer is endowed with a legitimate property right. Hoffman and Spitzer (1985) present experimental data which support this view. The ultimatum game experiments summarized in Hoffman et al. (1994) extend Hoffman and Spitzer (1985)'s property rights assignment to ultimatum games.

2. Experimental Design

We begin with a replication of Forsythe et al. (1994)'s $10 ultimatum game experimental design, with subjects at the University of Arizona and with 12 subjects participating at one time in the same room. We maintain the language that the pair has been "provisionally allocated" the $10 and that the task is to "divide" the $10. We refer to this design as the random/divide $10 experimental treatment. Our results are statistically indistinguishable from Forsythe et al. (1994).

We then induce property rights in the position of proposer in two different, and reinforcing ways. First, following Hoffman and Spitzer (1985), we have proposers "earn the

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		Seller Chooses PRICE										
		$0	$1	$2	$3	$4	$5	$6	$7	$8	$9	$10	
Buyer Chooses to	BUY	$0	$1	$2	$3	$4	$5	$6	$7	$8	$9	$10	Seller profit
		$10	$9	$8	$7	$6	$5	$4	$3	$2	$1	$0	Buyer profit
	NOT BUY	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Seller profit
		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Buyer profit

Figure 1. In the Exchange treatment version of the ultimatum game the seller receives a form like the one shown here. The seller chooses a price by circling one of the amounts from $0 to $10. Note that each price represent an offer to split the $10 exactly as in an ultimatum game. This executed form is then transmitted to the matched buyer who circles either "BUY" or "NOT BUY."

right" to be proposers. After the instructions are read, all 12 subjects answer 10 general knowledge quiz questions, selected at random from a large data bank of questions. The subjects are rank ordered on the basis of the number of right answers; ties are decided on the basis of how rapidly subjects complete all 10 questions. The highest scoring subject is made proposer number 1, the second-highest is proposer number 2, . . . , the seventh-highest is made recipient number 1, and so on. The highest scoring subject is paired with the seventh highest, the second is paired with the eighth, and so on. When all the positions have been determined, individuals in the proposer role are privately and individually informed that they have "earned the right" to be proposers. It is common information, however, that the purpose of the general knowledge test is to determine which subjects will earn the right to be proposers.

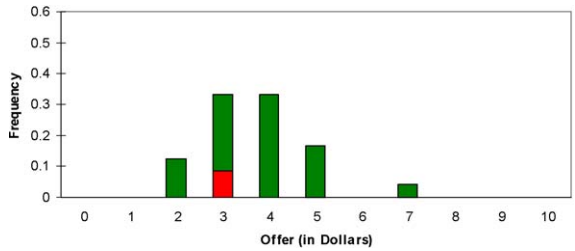
Second, recognizing that the United States' culture affords sellers the "right" to make a profit by moving first to quote a price, we describe the game as a market, with sellers and buyers instead of proposers and recipients. In early experiments with bilateral monopoly using the same strategic structure as the ultimatum game, Fouraker and Siegel (1963) generate sub-game perfect equilibrium results using a seller–buyer exchange.

Figure 1 illustrates our task for sellers and buyers. Notice that the reduced form of the game is identical to an ultimatum game. The seller moves first by choosing a price (division of the $10 payoff). A price of $0 implies $0 for the seller, $10 for the buyer; a price of $5 implies $5 for each; and a price of $9 implies $9 for the seller, $1 for the buyer. The buyer moves second and has the task of deciding whether to buy or not buy (accept or reject the offer). If the buyer circles "buy," the seller is paid the price chosen and the buyer is paid $10 – price. If the buyer circles "not buy," both get $0.

Combining the two methods of inducing a property right in being the proposer creates the 2×2 experimental design described in Figure 2. We ran 24 pairs of subjects in each of four experimental treatment cells: random/divide, random/exchange, contest/divide, and contest/exchange.

(a)

(b)



(c)

Figure 2. (a) Replication in which 24 pairs use Forsythe et al. (1994) instructions for the $10 ultimatum game with random assignment of the right to propose a division of the $10. (b) Treatment with 24 pairs using Forsythe et al. (1994) instructions, but in each of four sessions with 12 subjects the right to propose a division of the $10 is earned by being among the top 6 scores on a general knowledge quiz. (c) 24 pairs use instructions which formulate the $10 ultimatum game as an exchange between a buyer and a seller (see Figure 1). In each pair the right to be the seller-proposer is assigned at random. (d) 24 pairs use the buyer/seller exchange instructions, but the right to be the seller-proposer is earned by scoring highest on the general knowledge test as above.

3. Ultimatum Results

Figure 2 presents the results for all four experimental treatments. The green bars represent the percentage of accepted offers; the red bars represent the percentage of rejected offers. Where statistical significance is reported, a Wilcoxon rank-sum test is used to compare the sample distributions of all offers across treatments.

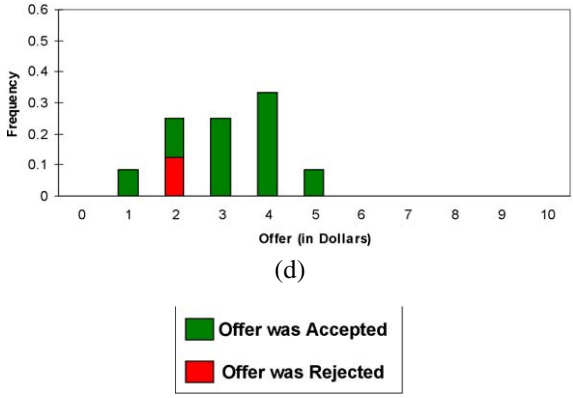


Figure 2. (*continued.*)

Comparing random/divide and contest/divide to determine the independent effect of the general knowledge quiz, we observe a (significant, $p = 0.03$) shift toward lower offers. Comparing random/divide and random/exchange to determine the independent effect of the market frame, we again observe a (significant, $p = 0.03$) shift toward lower offers. Comparing random/exchange and contest/exchange, the latter induces a (significant) shift toward lower offers. Comparing contest/divide and contest/exchange, the latter causes a (insignificant) reduction in offers. Finally, the difference between random/divide and the combined contest/exchange treatment represents a (highly significant, $p = 0.00$) shift toward lower offers.

The recipient results are particularly important in determining the effect of different ways of inducing property rights on shared expectations and the resulting impact on subject behavior. The first thing to note is that the rejection rates are uniformly low: $2/24$ (8.3%) in random/divide; $0/24$ in contest/divide; $2/24$ (8.3%) in random/exchange; and $3/24$ (12.5%) in contest/exchange. Moreover, none of these is statistically significantly different, either from one another or from the Forsythe et al. (1994) \$10 ultimatum game results. Thus, each treatment is successful in inducing not only a change in proposer behavior, but also in recipient expectations about appropriate proposer behavior.

4. Dictator Games and Results

Hoffman et al. (1994) also report results comparing the random/divide \$10 treatment with the contest/exchange \$10 treatment in dictator games. In Figure 1, when the form is used for the dictator exchange, the buyer cannot refuse to buy, and must accept whatever is offered. The results are shown in Figure 3. Under the random/divide treatment, 17.9% of the proposers offer nothing to their counterparts, and 25% offer \$5. Under the treatment that combines exchange with an earned property right, 41.7% offer nothing

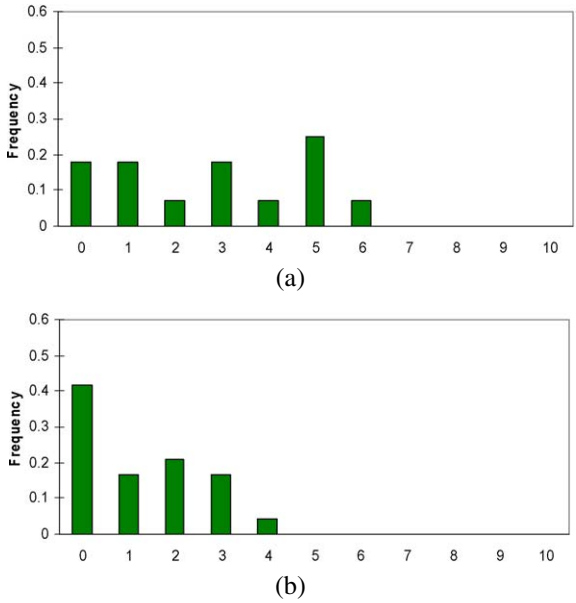


Figure 3. (a) Replication in which 28 pairs use Forsythe et al. (1994) instructions for the $10 dictator game with random assignment of the right to dictate a division of the $10. (b) Treatment in which 24 pairs use instructions that formulate the $10 dictator game as an exchange between a buyer and a seller. In each pair the right to be the seller-dictator is earned by scoring highest on a general knowledge quiz.

and there are no offers of $5. Consequently, the shift in shared expectations, and behavior, with the implied property right treatments in ultimatum games carries over to dictator games.

5. Discussion

These results demonstrate quite clearly the impact of property rights on the shared expectations about appropriate proposer behavior in both ultimatum and dictator games. If the game is presented as division (which by one definition means literally to separate into equal parts by a divisor) and players are randomly assigned to positions, there is no legitimate reason why the proposer should be allowed to exploit his or her strategic advantage. The norm of equality applies and both players assume that is the operating norm. Thus, in the ultimatum game, the proposer knows that deviations from equal division may be punished. In the dictator game, less than 20% of the dictators feel justified in leaving $0 and 25% still feel compelled to give $5.

However, when the game is presented as a market, with the proposer named the seller, the norm of equity allows the seller to earn a "profit" on the exchange. Similarly, when the proposer must "earn the right" to be a proposer, the norm of equity allows the pro-

poser to legitimately offer less than half. When the two procedures for inducing property rights are combined, sellers in the ultimatum game, who have earned the right to be sellers, make the smallest offers, and those smallest offers are accepted by the buyers. Now we observe even a small percentage of subgame perfect outcomes (2 in 24 offer $1). Moreover, in the contest/exchange dictator experiments, nearly 50% of the seller dictators, who have earned the right to be sellers, give $0 (the subgame perfect outcome) to their counterparts, and no sellers give $5.

In the ultimatum game experiments, proposers are engaging in reciprocity in all four property rights treatments. How they decide to exercise reciprocity is affected by the shared expectations about appropriate proposer behavior in each treatment. In the dictator game experiments, the shared change in expectations operates to change the dictators' assessments of what is appropriate behavior in a world in which reputations for reciprocity matter.

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