

The Effectiveness of an Information Sharing Strategy in Industrial Buyer and Seller Negotiations –  
An Experimental Study

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## **Abstract**

This paper reports the results of two experiments simulating buyer-seller negotiations over two periods. We introduce two bargaining asymmetries – an external threat price from an alternative supplier, representative of a type of buyer advantage that is commonplace in competitive business markets and the sharing of private information instigated by either the seller or buyer. Our experiments attempt to reconcile conflicting propositions about the effect that information sharing has on negotiated outcomes when buyers/sellers negotiate a single issue (contract price), particularly in the presence of a buyer's threat, to switch to an alternative supplier who has made a price bid. Results show that there is a positive effect of information sharing on price, beneficial to the seller, but this only occurs when the seller is facing a buyer's threat price. In the absence of a threat, there is no effect of information sharing. Furthermore, we find that prices negotiated under threat and information sharing are perceived as fair by the buyer, and a seller sharing information is given credit by the buyer for having influenced the negotiation process and outcome. Taken together, results indicate that sellers should use an information sharing strategy only when facing the power asymmetry posed by a buyer with a credible threat. The bargaining frontiers in our experiments consist of specific price points corresponding to solutions that are formally equitable alternatives to axiom-based bargaining solutions. One of the formally equitable solutions on the bargaining frontier, a solution providing equal gain of utility from each player's minimum utility point, occurs most frequently when there is both threat and information sharing.

Key Words: Asymmetric bargaining, equitable outcomes, information sharing, perceived fairness

## **Background and research goals**

Research on general and specific influence strategies amongst parties in industrial marketing negotiations has a long history (Pruitt, 1981; Frazier and Summers, 1984; Hunt, Ray and Wood, 1985; Perdue and Summers, 1991). The experimental research reported in this paper explores a specific influence strategy from the perspective of a seller trying to overcome a bargaining asymmetry favoring the buyer. The recent negotiations between the National Football League (NFL) and National Basketball League (NBL) and their respective player unions provide a relevant context for our research: NFL team owners were reluctant to share full financial information and the player's union invoked their threat of disbanding and thereby filing a federal anti-trust case against owners. In return, owners 'locked-out' players. In the end game, owners revealed enough information to achieve a settlement but a settlement that did not practically reduce player benefits, at least for veteran players. The NBA's renegotiation of its expired CBA may play out similarly.

Our study poses a practical question: Can the sharing of private information by sellers about the utility or value of possible negotiated outcomes overcome a buyer's advantage? An academic question is, regardless of whether sellers exchange information or not, do buyers perceive resultant settlements to be fair? There has been much interest in the marketing and management literature (Zwick and Chen, 1999; De Bruyn and Bolton, 2008) on the perceived fairness of bargaining outcomes. We investigate perceptions of fairness for negotiated settlements under a combination of a threat price and information sharing. Our study also examines the frequency of negotiated settlements based on the comparability and fairness of payoffs. We show that a particular 'comparable and equitable' solution called equal earnings (EE) is more prevalent when buyers have a threat and sellers share private information to counter the buyer's threat. Through content analysis of bargaining statements we attempt to follow the sequence of steps in the negotiation process, starting with the inception of an idea linked to a particular anchor point

by the party sharing its private information. The process is analogous to a heuristic method of arriving at a particular type of outcome.

The marketing literature in general suggests sellers should gain when they share private information with buyers. Any information that reduces uncertainty about a seller in the mind of the buyer might help the seller's cause by creating more confidence and trust in the seller (Mishra, Heide and Cort, 1998). For instance, a buyer may have no way of knowing if a seller is offering a low price because the seller is a low quality supplier (adverse selection problem) and/or if the seller intends to compromise on quality once the contract is secured (moral hazard issue). Incomplete information about characteristics such as sellers' costs and capabilities are another source of uncertainty. A buyer's anxiety about might be reduced if the seller provided some clear information about such issues during negotiations. On the other hand, it is very likely buyers *or* sellers gain a bargaining advantage by acquiring proprietary information about the other side, such as knowledge of an opponent's preferences for the negotiation set under consideration. Second, the disclosure of this kind of information may mitigate a pre-negotiation advantage held by the other side (Greenhalgh and Chapman, 1998; Cannon and Perreault, 1999). Westbrook (1996) hypothesizes that a seller facing an unfavorable power asymmetry would be more likely to offer high risk-coordinative maneuvers – for example, a less powerful seller would exhibit unilateral, open disclosure. On the other hand, if sellers divulge information simply to preserve a bargaining position, an unintended effect might be to give an information-based advantage to the buyer who can exploit this to maintain the status quo or even drive down the negotiated price (Binmore, Shaked and Sutton, 1989; Srivastava & Chakravarti, 2009). We reconcile the conflicting results in previous research about the effect of information sharing by showing that under certain conditions sellers can benefit by initiating information exchange.

Our experiments are distinct from others in the field of marketing negotiations. The table below provides a comparison with selected research in this area. We predict and test the occurrence of certain

negotiation outcomes resulting from a combination of antecedents to a negotiation (threat and information sharing), and we examine the processes by which these outcomes arise. We show how information exchange by either the buyer or seller affects negotiated outcomes. Using content analysis of bargaining statements, we attempt to follow the sequence of steps in the negotiation process:

Study	Negotiation Environment/ Antecedents	Negotiation Process/ Behavior	Negotiation Outcomes	Empirical Testing
Perdue, Day & Michaels (1986)		✓		✓
Balakrishnan, Patton & Lewis (1993)	✓	✓		
Westbrook (1996)	✓	✓		
Menasco & Roy (1997)	✓		✓	✓
Buchan, Croson & Johnson (2004)	✓	✓		✓
Dukes, Gal-Or & Srinivasan (2006)	✓		✓	
Srivastava & Oza (2006)	✓	✓		✓
Present Study	✓	✓	✓	✓

## Hypotheses

We develop six research hypotheses. The first two hypotheses relate to the main effect on negotiated price outcomes of threat (H1) and the main effect on outcomes of information sharing (H2). Hypothesis (H3) states an interaction with information sharing on outcomes vary according to which party (buyer or seller) initiates the information exchange. H4 is an interaction hypothesis between information sharing and threat acting together on negotiated prices. The last two research hypotheses (H5 and H6) resolve questions of fairness and of the seller's influence on negotiations. H5 predicts the effect of threat and information sharing on buyers' perceived fairness of negotiated prices and a buyer's evaluation of a

seller's influence on the bargaining outcome. H6 says that sellers sharing private information in the face of a buyer's threat can achieve an outcome identical to a heuristic yet formally equitable solution.

#### *Threat or option price*

When the buyer possesses a threat-price, there is an asymmetry in bargaining power favoring the buyer. We expect results consistent with previous studies (Zwick and Lee, 1999; Gupta and Livne, 1988) that buyers are able to leverage a credible threat into lower price settlements. H1 is an obvious restatement from extant research but it is a necessary condition for hypotheses H3, H5a and H6.

**H1. *Main effect of a threat price on negotiated price:*** *The effect of a threat available to buyers is to lower negotiated prices.*

#### *Information*

Information exchange is a facilitating collaboration in negotiations: When sellers provide buyers with detailed information about the value they place on different outcomes, it signals a seller's commitment to an integrative solution (Ganesan, 1993). The other side of the argument is that information about the seller might give a buyer a bargaining advantage, which the buyer can exploit to drive down price (Srivastava & Chakravarti, 2009). Westbrook (1996) suggests a buyer with power is likely to engage in aggressive behavior, and such a buyer is more likely to demand reciprocal information from the seller (e.g., Perdue, Day and Michaels, 1986). As indicated in our review of theories about information sharing, there are conflicting forces at play when one party divulges private information in a negotiation, but overall we believe it is beneficial for a party to initiate information exchange.

**H2. Main effect of information sharing on negotiated price:** *Buyers and sellers should negotiate prices more favorable to them when they share private information. Buyers will negotiate lower prices and sellers will negotiate higher prices.*

It might be that the conflicting theories mentioned earlier, about the influence of information sharing on outcomes can be resolved by considering moderating factors such as power asymmetry. When there is a threat from an alternative supplier, sellers might benefit when they share information (Ganesan, 1993; Valley et al., 2002), because the positive impact of creating trust and goodwill outweighs the negative impact of the seller giving up an information advantage (Binmore, Shaked and Sutton, 1989; Srivastava & Chakravarti, 2009). When there is no threat from an alternative supplier, sellers might not see any effect when they share information because buyers resist any attempts to create imbalance in an otherwise symmetric bargaining situation; the negative and positive effect of providing information cancel each other. In an experimental study Van den Abeele, Roodhooft and Warlop (2009) found an interaction of this type, between exchange of accounting cost information and buyer power, acting on negotiated profits. Our hypothesis is specific to sellers using an information sharing strategy in negotiations.

**H3. Interaction of threat and information sharing on negotiated prices:** *When buyers invoke a threat price, sellers who share information negotiate higher prices than sellers who do not share information. When there is no threat, sellers who share information negotiate prices, which are similar compared to when they do not share information.*

The impact of information sharing might depend on whether the buyer or the seller is doing the sharing. A buyer who shares information about the value of various outcomes to themselves might come across as

sincere about reaching an agreement while a seller following the same information sharing strategy might seem over eager to reach an agreement.

Recent studies of buyer/seller negotiations have not broached the comparative advantage of information exchange between buyers and sellers. In this context, we define a ‘controlling party’ as initiating the sharing of private information and making a price bid (offer). When buyers are the controlling party, they should leverage this into lower prices as should sellers leverage higher prices when they are the controlling party. However, this advantage should be greater for buyers than for sellers. We expect buyers to negotiate prices relatively more favorable to them when they are the controlling party compared to sellers as the controlling party. In practice, Wal-Mart illustrates this negotiating behavior by getting the lowest possible prices from its suppliers. Essentially, this is a BATNA (Best Alternative to a Negotiated Agreement) approach to price bidding.

The relative power of the party doing the sharing could also be a factor (as the Wal-Mart example illustrates), so we might expect a three way interaction between power, party controlling information exchange and the sharing of information itself. However, since we do not know how a powerful seller might leverage information, we only hypothesize a two-way interaction between information sharing and the party initiating the exchange.

**H4. *Interaction effect of information sharing and party initiating information exchange on negotiated price: Buyers as initiators of information should negotiate prices more favorable to them compared to sellers using the same information sharing strategy.***

#### *Fairness*

Research in marketing and experimental economics reports conflicting results on how buyers and sellers reconcile perceptions of fairness with the other side’s influence on negotiations. For instance, Valley, *et*

*al.* (2002), and De Bruyn and Bolton (2008) suggest that perceived fairness is a function of negotiated prices against a default price. In our case, the threat price is an obvious candidate for the default outcome and we expect it to be easier for negotiators to evaluate an outcome as fair by comparing it to the threat price. Other research has reported inconclusive results about the relationship between fairness tied to both negotiated outcomes and perceived influence from the other party: Greenhalgh and Chapman (1998) reported a positive correlation between joint gains (payoffs) and a measure of bargainers sharing information. In their study however, information sharing did not have an impact on subjects' perceptions of fairness for outcomes.

Previous studies suggest that a seller's manifest influence is a function of sellers sharing information. Cannon and Perreault (1999) show that sellers who share information can influence negotiated outcomes. We expect that buyers notice this influence – the sharing of information by sellers should increase buyers' perception of seller influence on the process and outcome of the negotiations. Our tests of H5 examine the links between actual outcomes, perceived fairness and perceived seller influence, and between these three endogenous variables and the exogenous variables of threat and information. This is a two-part hypothesis:

**H5A. *Main effect of threat on perceived fairness:*** *Buyers perceive greater fairness for negotiated outcomes when they possess a threat price compared to when they do not have a threat.*

**H5B. *Main effect of information on seller influence:*** *Buyers perceive sellers having greater influence on the negotiation when sellers share information compared to when sellers do not share.*

### *Equity*

Prior research on buyer/seller negotiations suggests that, ideally, negotiated outcomes should correspond to an objectively fair outcome that is normatively equitable to both sides (Srivastava,

Chakravarti and Rapoport, 2000). For instance, an equitable distribution of payoffs is a common property of axiomatic bargaining as with Nash (1950) cooperative equilibrium. Axiomatic solutions based on interpersonal utility comparisons and utility gains and losses were proposed a long time ago (e.g., Kalai, 1977; Myerson, 1977) in response to Nash's 50/50 solution. In marketing, Menasco and Roy (1997) showed how bargainers could achieve equity using equal earning or equal loss solutions on Pareto frontiers described by attribute scores or utilities derived from a weighted, multi-attribute utility function. Specifically, we expect to find a preponderance of an equitable (and efficient) solution in which each side gains an equal amount of utility from their respective minimum utility points in the bargaining set. The minimum utility point is an anchor point or ultimate fallback position beyond which a negotiator will not concede (Balakrishnan, Patton and Lewis, 1993). This equal earning settlement is more likely over other equity solutions like an equal loss settlement or equal utility settlement, because it favors a threat-wielding buyer at the lower price end while assuring the seller earns utility over his/her minimum equal to the buyer's gain.

**H6. Interaction of threat and information sharing on a specific type of fair solution:** *When buyers possess a credible threat price, sellers sharing information will negotiate more price outcomes, corresponding to a formally equitable solution involving equal utility gains to both parties.*

### **Experiment 1**

Experiment 1 tests each of the hypotheses except H5, which can only be tested in experiment 2. Experiment 1 is a three-way design (threat x information x buyer/seller) with two levels of each factor for a (2 x 2 x 2) experiment. In the 'threat' condition, the buyer could invoke a price offered by a rival supplier, and in the 'no-threat' condition, the threat price was not available. In the buyer/seller condition,

in round two of the negotiation (if necessary) either buyer or seller initiated the exchange of information. We define buyers or sellers who share private information as the ‘controlling party’ because they simultaneously initiate the second bid

### *Subjects*

MBA students played the roles of buyers or sellers. The mean age of subjects was 28 years with an average work experience of three years. Two-hundred and twenty-six (226) subjects participated in experiment 1. We randomly assigned subjects to buyer or seller roles. Our experiment is an unbalanced design (i.e., unequal cell sizes). Of the original 125 pairs who participated in the experiment, 113 pairs were able to negotiate a price after the second round – the rest either arrived at a settlement in the first round or were unable to reach agreement after two rounds.

Of the 113 pairs who reached an agreement after two rounds, 58 pairs had shared private information while 55 pairs had not shared information about utilities for prices. For the seller subsample, 27 sellers were the controlling party, initiating information exchange and making a second price bid, and 25 sellers did not share information. Similarly, for the buyer subsample, 31 buyers were the controlling party and 30 buyers did not share information. Subjects received course credits for participation, and a higher grade for getting closer to the best possible outcome for their role. Bargaining pairs used a private (visible only to the pair) online discussion board to write their bargaining positions before entering into verbal negotiations. Apart from facilitating the negotiation process for each buyer-seller pair, the written bargaining statements also provided a real-time record of the bargaining process. Details of the experimental steps are in the Appendix.

### *Scenario*

The experimental scenario described an ongoing relationship between an industrial buyer and seller for which the parties had to renegotiate a new contract for bulk copier paper. Buyers for [fictitious] *Mountain Community Services District* (MCSD) negotiated with sellers for [fictitious] *Mountain Paper Supply* (MPS). Sellers (MPS) made a first price offer, which buyers (MCSD) either accepted or rejected. If the buyer rejected the seller's offer, the negotiation moved to a second stage for which the buyer or seller in each bargaining pair initiated the second bid. As noted above, buyers or sellers who offered the second bid had to share information under one experimental condition but not in the other condition.

### *Negotiation Set and Distributive Outcomes*

The cover story in the experiment was that an economist for a bargainer's respective organization (MCSD or MPS) calculated utilities for possible price points they could negotiate. The end-point prices of \$13 (lowest) and \$16 (highest) were assigned the utilities (-10,100) for the seller and (100, 10) for the buyer. From experimental instructions, these extreme prices were historically the lowest and highest prices negotiated throughout the industry. We used these buyer/seller linear utility functions to establish anchors from which bargainers could compare interior price-points on the Pareto frontier. Our approach is similar to that reported by Kristensen and Garling (2000) in which they used a high and low 'market price' as end-points, so that buyer or seller possessed a common reservation price. For our experiments, we established common anchors by using historically minimum (MNP) and maximum (MXP) prices MCSD and MPS had negotiated in the past. Our economist had calculated the following utilities for the set of prices on the Pareto frontier (see Table 1 and Figure 1):

MNP is the minimum price paid (\$13.50) by the buyer in historical dealing with the seller. This price yields minimum utility (8) to the seller and maximum utility (86) to the buyer.

EE is the price (\$14.40) at which seller and buyer each *earn* equal units of utility over their minimum utilities (corresponding to MNP for seller, MXP for buyer). This corresponds to the pair of utilities (42, 59) for seller and buyer respectively.

RU is the current contract (reference) price (\$14.57) with utilities of (48, 53) to seller and buyer.

EL is the price (\$14.60) at which seller and buyer each *lose* equal units of utility over their maximum utilities (corresponding to MXP for seller, MNP for buyer). This corresponds to the pair of utilities (49, 52) for seller and buyer respectively.

EU is the price (\$14.65) that yields equal utility (51, 51) to seller and buyer.

MXP, the maximum price (\$15.50) paid by the buyer in its history with the seller. This price yields maximum utility (83) to the seller and minimum utility (25) to the buyer.

<Table 1 about here>

<Figure 1 about here>

The outcomes in which we are particularly interested are the equal earnings (EE) and equal losses (EL) solutions. For the EE settlement, each party can gain an equal amount from its worst outcome in the bargaining set. Similarly, there is an EL settlement, where each party loses an equal amount of utility from its best possible outcome in the bargaining set. Because the bargaining frontier is linear in our experiment, the amount of utility gained from the minimum utility points in EE settlements is equal to the amount lost from the maximum utility points in EL – this amount is 34 utility points. The equal earnings (EE) solution is at the low price end, favoring buyers, while the equal loss (EL) solution is at the high end, favoring sellers. Thus, equal earning (EE) involves a gain =  $(59 - 25) = (42 - 8) = 34$ ; where 25 = buyer's minimum (MXP) utility, and eight (8) = seller's minimum (MNP) utility. Similarly, equal loss (EL) involves a loss =  $(86 - 52) = (83 - 49) = 34$ , where 86 = buyer's maximum (MNP) utility and 83 = seller's maximum (MXP) utility.

### *Main factors – Threat and Information*

Threat: For the ‘threat’ condition, an industry source for the buyer indicated that a competing vendor would offer copier paper at an estimated cost of \$13.80 a case. For the first condition, sellers and buyers were aware of this threat price. For the second condition, the threat price did not exist.

Information: In the first round of negotiations, buyers and sellers saw only their own utilities for prices as shown in Table 1. Sellers initiated the first bid in each case. In the information condition, buyers shared information in about half the cases, and in the other half sellers initiated information exchange. We refer to the initiator of information exchange as the controlling party because they also initiated the second round bid. A possible problem, eliminated in experiment 2, is that the party sharing information also received information about the value of outcomes (utilities for prices) of the other party. In other words, while they were instructed to divulge the details of their own price utilities, their subsequent arguments (for example, “I know what this price is worth to you and it would be fair if...”) and their behavior (price bids) might have been influenced by this extra knowledge about their opponent. Under information sharing, the process of arriving at a settlement might involve something like this: sellers might explain to buyers that that they both would be 34 utility points better off than their respective minimum utility points (worst-case scenario from the bargaining frontier) by agreeing to a price of \$14.40. The seller would show that compared to the minimum price of \$13.50 (worst case for the seller) he (seller) would gain 34 utility points. Buyers could refer to their own price utilities and recognize that at a price of \$14.40, they (buyers) would also gain exactly 34 utility points compared to a maximum price of \$15.50 (buyer’s worst outcome in the bargaining set). Other solutions on the bargaining frontier were also available to both parties, such as the equal earnings (EU) or reference utility (RU) solutions.

## **Tests of Hypotheses using Experiment 1**

### *Pretests*

We conducted a pretest with a sample of 42 purchasing professionals recruited from a conference of the California Association of Public Purchasing Officials (CAPPO). Participants played the roles of buyer or seller in our negotiation scenario. They affirmed that the experiment was realistic and that price-utility information was reasonably useful in reaching a negotiated price. In a later pre-test with a sample of 50 executive MBA students, we used the option price of \$13.80 as an endpoint. In other words, it was the highest utility price for buyers and the lowest for sellers. This end-point price yielded significantly lower negotiated prices when buyers revealed the \$13.80 price as their threat point. Thus, we were confident about using the \$13.80 price as a credible threat.

### *Manipulation Check*

We asked subjects in the role of buyer or seller to record their reservation prices for an upcoming negotiation as described in the Appendix. Since bargainers in this experiment only knew about information sharing possibilities in the second round of negotiation, we cannot expect differences in reservation prices related to the information manipulation. However, stated reservation prices for both sellers and buyers show that the threat manipulation worked: Sellers revealed a significantly higher reservation price ( $p = .03$ ) under no threat (mean \$14.88,  $n = 56$ ) vs. threat (\$14.74,  $n = 69$ ). Buyers also had significantly higher reservation prices ( $p = .025$ ) without threat (\$14.27,  $n = 56$ ) compared to threat (\$14.10,  $n = 69$ ).

### *Tests of H1 and H2*

Table 2 shows the cell means and marginal means in experiment 1 for negotiated price. Table 3 shows results of a (2x2x2) ANOVA of negotiated prices. Results reported in Table 3 support hypothesis H1 for the main effect of threat ( $p = .002$ ) as we would expect. However, there is no support for H2. The main effects of information sharing and the interaction of threat and information proposed by H3 are not significant (threat\*info,  $p = .16$ ).

Separate ANOVA of the buyer and seller subsamples reveal some reasons for the lack of significance in combined sample results. For the seller subsample, only threat was a significant factor ( $p < .05$ ). The interaction coefficient (threat\*info) was not significant ( $p = .16$ ). Moreover, Table 2 shows that sellers negotiate average prices under information sharing and no threat (\$14.28) that are practically not much higher than under information sharing and threat (\$14.20); looking at these results, it does not seem that information sharing works as a negotiation strategy for the seller. However, \$14.20 is considerably better than the worst outcome, \$13.99, which occurs when buyers wield a threat and sellers are unable to share information – this suggests that information sharing can help a seller achieve better outcomes.

### *Tests of H3 and H4*

The ANOVA results in Table 3 provide weak support for H3 as evidenced by the coefficient of the interaction term involving threat and information sharing ( $p=0.16$ ). When we examine the ‘threat’ and ‘no threat’ cells separately for the seller sample we find directional evidence for the hypothesized interaction H3. When there is no threat, the seller who shares information actually does worse (average negotiated price of \$14.28) compared to when he does not share information (\$14.41). In the absence of a threat, it is better for sellers to keep private information to themselves. The anticipated increase in price settlements only occurs when the seller shares information under a threat (average \$14.20 with information sharing compared to \$13.99 with no sharing). A plot of the cell means reveals a reversal of slope so, despite the

lack of significance of the (threat\*information) term in ANOVA, there is some justification in examining the hypothesized interaction between threat and information further.

The main effects of threat and information exchange for the buyer subsample are both significant ( $p < .05$ ) but the interaction is not significant (table not shown). In Table 2, we note that buyers who exchange proprietary information drive down average negotiated price to \$13.89, nearly to the threat price of \$13.80. When buyers do not share information, the settlement price is \$14.06. Apparently, threat is the larger driver of lower prices for buyers in our sample but information sharing also benefits the buyer significantly. The fact that the main effect of information is significant for buyers as controlling party but not for the seller sub-sample provides some evidence to support H4 that the influence of information sharing depends on which party uses this strategy. Note that the relevant interaction coefficient (info \* buyer/seller) in the combined sample is not significant (Table 3) so support for H4 is limited. Examination of the cell means (Table 2) provides directional evidence supporting H4. When the seller shares information he only manages to increase negotiated prices by \$0.04 (from \$14.19 to \$14.23) whereas buyers who share information manage to lower prices \$0.24 (from \$14.24 to \$14.00).

< Table 2 about here >

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compared to \$13.99 with no sharing). A plot of the cell means (Figure 2) reveals a reversal of slope so there is some justification in further examining the hypothesized interaction between threat and information.

< Table 3 about here >

< Figure 2 about here >

### *Tests of H6*

The preponderance of a specific type of equitable and efficient solution, an equal earning or gain of utility from the worst-case outcome for each party, is tested using categorical modeling and the results summarized in Table 4. We counted a price settlement as a particular discrete outcome if it was closer to the discrete solution than to other solutions on the Pareto frontier. An examination of the frequencies of discrete categories of settlements in the seller sub-sample (we do not show the frequency table for experiment 1 but it is similar to a later Table 7) reveals evidence to support H6. Subjects negotiated a disproportionately large number of EE settlements when there was a threat and the seller used an information sharing strategy to counter the threat.

We use a discrete dependent variable version of an ANOVA model (Bishop, Feinberg and Holland, 1975), with relative frequency of EE outcomes (ratio of frequency of EE divided by frequency of least frequently occurring outcome – EU) as the dependent variable, and threat and information sharing as the independent factors. As shown in Table 4 the coefficient of the information sharing factor is significant at  $p < 0.05$  and the interaction between threat and information is marginally significant ( $p = 0.07$ ); there is initial evidence to support H6.

< Table 4 about here >

To summarize, of the five hypotheses that can be tested using experiment 1 (H5 is tested using experiment 2), there is strong support for H1 and H6, and only weak support or directional evidence for H2, H3 and H4. Separate ANOVAs for the seller and buyer sub-samples show a significant main effect of information exchange in the buyer sub-sample but not the seller subsample. Also, while the slope reversal mentioned earlier is interesting, with the smaller seller sub-sample the threat-information interaction coefficient is only significant at  $p \leq .10$ . In order to resolve the issue of whether information sharing has a significant effect for a seller who uses this strategy (H2), and whether there is indeed an interaction between threat and information acting on negotiated prices (H3), it is necessary to conduct a second experiment concentrating on the seller as the initiator of information exchange. In our second experiment, we also examine the impact of information sharing by a seller on some perceptions that the buyer might have at the conclusion of the negotiation.

## **Experiment 2**

The Appendix presents an outline of the conduct of the experiment and instructions to subjects in their roles of buyers or sellers. The basic experimental design is a (2 x 2) factorial with information sharing and threat as main factors. The cover story and the bargaining setup in experiment 2 is the same as in experiment 1. With a focus on information sharing as a selling strategy, we allow only sellers to share private information in this experiment. Additionally, in order to test H5 we measure the dependent variables of perceived fairness of the negotiation, and manifest influence of the seller (in the opinion of the buyer). Note that, in order to avoid a possible confound with information sharing, unlike experiment 1 we did not provide sellers who had to share private information with details of the buyer's utilities for prices. In other words, the information sharer only divulged details of their own values for outcomes –

they could not tell buyers “I know what this price is worth to you...” We hoped this would lead to a ‘cleaner’ exchange of information.

### *Subjects*

MBA students played the roles of buyers (MCSD) and sellers (MPS). The mean age of subjects was 32 years with an average work experience of five years. Twenty-five percent of subjects claimed familiarity or direct experience with professional selling or purchasing functions. Sixty-two (62) of an initial 76 bargaining pairs completed the experiment. Subjects received course credits for participation, and a higher grade for getting closer to the best possible outcome for their role. As in experiment 1, computers facilitated the negotiation process – an online discussion board, specific to each bargaining pair, provided a real-time record of the arguments made by negotiators.

### *Dependent variables*

Negotiated price was a dependent variable as in experiment 1 – this enabled a test of the interaction hypothesis H4. We considered negotiated price to be a continuous variable. As in experiment 1 negotiators were not restricted to the exact price points on the bargaining frontier (Table 1). For tests of H5 we used constructs from Campbell (2007) measuring buyers’ ‘perceived fairness’ for negotiated outcomes (PF), and from McFarland, Challagalla, & Shervani (2006) measuring buyers’ evaluations of ‘manifest seller influence’ on the negotiation process (MI). The Appendix describes the five-point scales for each construct. Both scales were reliable with Cronbach alpha values of .93 for the perceived fairness scale and .91 for the manifest influence scale.

### *Manipulation checks*

For experiment 2, the stated reservation prices for both sellers and buyers show that the threat manipulation worked. Sellers had significantly higher reservation prices ( $p < .05$ ) under no threat (mean \$14.82,  $n = 29$ ) than under threat (\$14.71,  $n = 33$ ). Buyers also had significantly higher reservation prices ( $p < .05$ ) without threat (\$14.27,  $n = 29$ ) compared to threat (\$14.10,  $n = 33$ ).

### *Results of tests of H1, H2, and H3*

Table 5 shows average prices negotiated after the second round in experiment 2. None of the 62 pairs arrived at a negotiated settlement after just one round. Although we made it clear to subjects that a first round settlement was acceptable, they might have guessed that there was more to the game than a single round of negotiations. Because there was no discounting of payoffs in the first round, we believe the second round still fairly represents the results of negotiations. With three dependent variables in experiment 2 we used MANOVA to estimate the effects of the manipulated factors on the dependent variables. MANOVA results in Table 6 show significant effects ( $p < .05$ ) of threat, information sharing and the interaction between threat and information on negotiated prices. As in experiment 1, the results for main effects support the conventional wisdom that a threat price lowers negotiated prices. However, we now have clear evidence that sellers sharing information raises negotiated higher prices – Table 5 reports marginal means for each treatment variable. Overall, sellers helped their cause by sharing information with buyers: the average negotiated price under information sharing was \$14.24 compared to \$14.01 when sellers did not share. This represents a significant difference, as compared to the corresponding difference in the seller sub-sample of experiment 1. There is an interaction between threat and information, which acts in the way hypothesized in H3. When buyers did not possess a threat, the impact of information sharing was negligible – sellers sharing information fared the same (average negotiated price of \$14.23) compared to no information sharing (\$14.24). For buyers with the threat price

and sellers sharing information, bargainers negotiated an average price of \$14.25 compared to \$13.85 when there was a threat and sellers did not share. Results are consistent with the argument that, in the absence of a threat, self-interest causes buyers to take advantage of the information and this neutralizes the positive effects of sellers sharing information; sellers only manage to achieve the same results through information sharing as they do without sharing information. On the other hand, when there is a threat the buyer, in a relative position of power, seems to be more amenable to the arguments made by a seller who has shown a commitment to a settlement and created trust by sharing private information. The result is significantly higher price outcomes when there is an information sharing strategy compared to when sellers use alternative negotiation strategies to counter the threat.

<Table 5 about here>

<Table 6 about here>

#### *Tests of H5*

We investigated the normal and partial correlations for buyer perceived fairness (PF) and perceived manifest seller influence (MI) assuming negotiated prices to be a mediator variable. The simple correlation between PF and MI in our data set was  $r = .34$  (two tailed  $p = .01$ ). Although the correlation was significant, the shared variation between the two variables was just 12%. When negotiated price was added as an explanatory variable in a regression model to explain PF, the partial correlation between MI and PF was marginally reduced ( $r = .29$ ,  $p = .03$ ). However, by accounting for the effects of our threat and information factors, the partial correlation reduced to near zero ( $r = .09$ ). Taken together these results indicate that PF is independent of both actual price settlements and MI.

Results of the MANOVA reported in Table 6 do not support hypothesis H5A about buyers perceiving greater fairness (PF) when they have a threat price ( $p = .295$ ). Average scores for perceived fairness were 3.34 ( $n = 29$ ) under no threat and 3.64 ( $n = 33$ ) under threat (Table 4). Unexpectedly, the information factor was significant – the mean PF scores were 3.00 ( $n = 29$ ) for no information sharing and 3.94 ( $n = 33$ ) for information sharing. These results are inconsistent with Greenhalgh and Chapman (1998). Our buyers believed sellers sharing information to be more relevant to their evaluations of fairness than the source of their own negotiation advantage. The main effect of information sharing on buyers' perceived manifest influence (MI) was significant ( $p < .01$ ) and supports hypothesis H5B, that information sharing by sellers creates a perception of greater seller influence. Average MI scores were 2.38 ( $n = 29$ ) and 3.97 ( $n = 33$ ), respectively, for ratings of perceived seller influence (Table 5). As with perceived fairness (PF), the interaction between threat and information sharing was not significant for MI (see Table 6). Overall results show that information sharing by sellers independently drives both buyers' evaluations of fairness and seller influence, but that a buyer's threat has no influence on perceived fairness or manifest influence.

### *Tests of H6*

Table 7 presents a summary of the frequencies of occurrence of discrete price outcomes in experiment 2. As with experiment 1, we counted negotiated prices belonging to a specific, discrete solution type if they were closer to that solution price than to other solutions on the Pareto boundary. The frequencies of five discrete outcomes were cross-tabulated with the main experimental conditions of threat and information sharing. EU is the equal utility price (no bargaining pairs negotiated a higher MXP price), while R5 includes the range of negotiated prices between the threat price (TP) and the minimum (MNP) price. The middle three categories are negotiated prices defined previously as equal loss (EL), reference (RU), or equal earning (EE). When negotiated prices other than these occurred in the experiment, we assigned the price to the category that was closest. The table shows that the EE price is the only viable

integrative (and normative) solution comparable to the R5 low-end price (32 EE prices versus 24 R5 prices). To test for the factors of threat and information sharing predicting EE/R5 prices, we used multinomial regression in SPSS. Only the information sharing was a significant predictor (estimate = 2.18,  $p = .001$ ). Neither threat nor an interaction with information sharing was significant. The significant result for information sharing provides partial support for H6. Sellers sharing information aided the incidence of EE outcomes (25 EE vs. 7 R5) while sellers not sharing information aided the incidence of R5 outcomes (17 R5 vs. 7 EE).

<Table 7 about here>

As with experiment 1, we conducted further analysis of the EE outcome, and tests of hypothesis H6. We again used a categorical modeling approach based on the discrete variable ANOVA model of Bishop, Feinberg and Holland (1975). The dependent variable was the relative frequency of EE outcomes, and threat and information sharing were independent factors. Table 8 shows the results of CATMOD analysis (SAS), and these are similar to the results reported in Table 4.

<Table 8 about here>

The significant coefficient ( $p < .05$ ) of the information term as well as the significant coefficient of the interaction term involving information and threat ( $p < .05$ ) provides additional support for H6. The sharing of information, especially under threat, leads to a higher frequency of settlements that correspond to an EE solution. In a way, this result is stronger than that from experiment 1 because a high number of EE outcomes occurred even when the information-sharing seller was unaware of the utilities for prices of the buyer. It must have been more difficult for sellers sharing information to make utility comparisons between each party but the end-result was still a disproportionate number of EE settlements.

## 5. Discussion

Our research provides an industrial seller with some guidelines on when to withhold private information to preserve a bargaining position and when to divulge it, while maintaining an environment of fairness in negotiations. Our experimental results show that sellers should not share information except when buyers can invoke a threat. We show that sellers can create a perception of fairness when they share information with buyers – a perception that is unrelated to actually negotiated prices. In the two concluding subsections below, we illustrate how a strategy of information sharing by a seller might intersect with fairness for both parties in a negotiation.

### *To share or not to share*

The interaction effect in our study occurred because sellers did better when they shared information under a threat price, while information exchange did not benefit sellers in the absence of a threat. Our results do not show a seller advantage by sharing information unless buyers possess a threat. Clopton (1984) asserts that buyers receiving clear and accurate information about a selling firm's profits at various price points might engage in less competitive behavior than buyers who receive ambiguous information about the seller. Our results partially support this assertion. Our buyers who possessed 'full' information (as a result of sellers sharing information with them) negotiated prices, equal on average to those settlements under the 'null' condition with no threat and no sellers sharing information; one can infer that buyers who had full information were about as 'competitive' or aggressive as those who had partial information. According to our study, only buyers in a position of power behave less competitively after receiving information, as Clopton (1984) predicts. Although Alexander, Schul and Babakus, (1991) claim that industrial buyers rely heavily on information requests to sellers, meeting these requests might not be advisable on the seller's part. Before sharing private information, sellers should assess the likelihood of buyers leveraging an information advantage. Since this likelihood might depend on asymmetries in the

bargaining environment, sellers should consider the environment before using a sharing strategy. For instance, at times when California Milk Board prices fell and buyers were attempting to negotiate lower retail prices, it was worthwhile for dairy producers to reveal their cost information to buyers (California Processor Board, 1993). Otherwise, not revealing costs was a better strategy to maintain producer margins.

A major implication of our research is that sellers should share information depending on the type of asymmetry they encounter with buyers. Clearly, for some asymmetries favoring the buyer, such as an information or knowledge-based advantage, sellers would only exacerbate their own disadvantage by sharing private information. Future research should investigate and specify other asymmetric conditions under which sellers do or do not gain by sharing information. Some examples might be the influence of unspecified attributes from a prior bargaining session, included in later contract negotiations (Iyer and Villas-Boas, 2003), or better knowledge about resale demand on the part of the buyer (for example, retailers knowing more about consumer demand than manufacturers, Roy (2000)). Another interesting area for future research is the potential interaction between information sharing and trust between negotiating parties (Butler, 1999). We have shown that when a buyer has an alternative offer from a third party, the seller can mitigate some of the buyer's advantage by sharing information. Not only did sellers in our study negotiate prices higher than the threat price (and much higher than the minimum price), but the outcomes were also perceived as fair by buyers, so presumably there was no damage done to the trust between the parties.

#### *The role of fairness in the negotiation process*

Results for H5B suggest sharing information will prompt buyers to impute greater seller influence compared to no information sharing. This result is what we expected. On the other hand, contrary to our hypothesis H5A, a buyer's threat had little or no effect on their perceived fairness for negotiated prices. If

we consider the threat price to be a point of comparison for actual negotiated price, the parity in perceived fairness between the threat and no threat condition is an interesting result. Instead of threat, information sharing by sellers had a significant effect on buyers' perception of fairness. Our finding that negotiated price is unrelated to perceived fairness suggests that buyers might consider the process of bargaining to be more relevant to their perception of fairness than the bargaining outcome itself. The process of 'balancing' endogenous information provided by the seller against an exogenously induced asymmetry (even if it favors the buyer) might seem fair to the buyer. The idea of bargainers seeking symmetry in the bargaining process allows us to generalize our results to cases where, for example, a seller might share information on its high material costs in order to counter buyer power based on superior knowledge of end-user demand.

Importantly, our buyers perceived outcomes (predominantly 'equal earnings (EE)' settlements) to be the fairest when sellers shared information under threat. As reported in section 4.4, a multinomial test showed that information sharing resulted in a greater frequency of equitable EE outcomes, while no information sharing resulted in more low-end price (R5) outcomes. Buyers' means on both perceived fairness (PF) and seller influence (MI) scales were significantly greater for EE outcomes than for R5 outcomes: Results of tests for independent samples were  $PF_{EE} = 3.73$  vs.  $PF_{R5} = 3.25$  ( $p = .05$ ;  $n_{EE} = 32$ ,  $n_{R5} = 24$ ) and  $MI_{EE} = 3.62$  vs.  $MI_{R5} = 2.71$  ( $p = .00$ ). Thus, buyers perceived EE outcomes as fairer compared to lower R5 prices and they perceived greater seller influence for EE outcomes.

It is plausible that buyers perceived the equal earning (EE) price as more fair because the idea that this solution "would trouble you only a little and would help me a lot" became apparent to buyers from sellers focusing on the minimum utility point – after all the EE solution is still skewed heavily in favor of the buyer. We can paraphrase a majority of our recorded on-line seller bargaining positions as ". . . let us work/build up from the 'low point', 'we can do better than the worst case', or 'you can afford to let me go higher than the lowest price'..." For a seller facing a threat price the trick to achieving better outcomes

(prices and fairness perceptions) seems to be to avoid mentioning the threat price but rather, to focus on an outcome that is even worse from their point of view; e.g., the minimum price (MNP) in the bargaining set.

While we measured fairness perceptions of buyers, sellers are likely to have a different perspective on fairness. For instance, sellers might perceive an equal loss settlement to be fairer than equal earning because the higher negotiated price favors them. In practical terms, our results show that sellers can overcome a threat price by focusing on the minimum utility point to each party and building up from this to a consensus point. From a relationship marketing perspective, outcomes arrived at via this route are perceived as fair by the buyer, even though the seller is perceived as having exerted significant influence on the negotiation process. This is good news for a seller who wants to use an information sharing approach (Frazier and Summers, 1984; Pruitt 1981) and is concerned about the effect this will have on the buyer's perception of fair treatment.

## **Appendix**

### **1. Description of experimental instructions:**

Subjects randomly assigned to their roles as buyer or seller and received the following cover story:

“A new contract is to be negotiated between MCSD and MPS to supply MCSD with copier paper for the coming year. MPS has been providing MCSD copier paper for the past five years. The industry price of copier paper fluctuated from \$13 to \$16 during the past two years. MCSD currently pays a price of \$14.57 per case to MPS. The price that MCSD has paid for copier paper in the past has ranged from \$13.50 to \$15.50 per case. MPS has provided MCSD with quality paper; but during the past year, MPS has had a few problems with on-time delivery.”

In the threat condition, both buyer and seller were aware that a competing vendor was prepared to offer copier paper to the buyer at a price of \$13.80 a case. Buyers and sellers were to negotiate a price for the coming year on behalf of their respective firms. Prior to a first round of negotiations, each bargainer viewed their corresponding utilities for price points shown in Table 1 (except for the threat price, since that might lead to a confound between threat and information sharing manipulations). The following summarizes the sequence for negotiators using the on line discussion board and for face-to-face negotiations in the experiment.

#### Steps in Negotiation Experiment

- Bargaining pairs sat facing each other across from their individual computer terminals. Subjects read the cover story and examined the data table on their side's utility for prices in the bargaining set. Observers answered any questions from subjects regarding experimental materials.
- Buyer (seller) indicated the highest (lowest) price that each was willing to accept for a new contract (reservation price) based on the industry range of \$13 to \$16 [*Reservation prices recorded*].
- Each negotiator typed their initial bargaining position at their computer. An observer prompted bargainers to post if they failed to do so – statements appeared on the dedicated online discussion board viewed by both parties (each pair's statements only visible to them).
- After verbal negotiation between the buyer and seller for as long as needed, the seller (MPS) made an initial price offer that the buyer (MCSD) would pay for copier paper during the next year [*Offered prices recorded*]. If MCSD accepted the price, negotiations were over [*Incidences of acceptance recorded with accepted prices*].
- If MCSD rejected the price, negotiations moved to a second round. Experimental instructions required buyers (or sellers) to share private information of utilities with their opponent. Each negotiator typed their second round bargaining position on the online discussion board even if

it was unchanged from the first round. An observer prompted bargainers if they failed to post.

- *[Incidences of acceptance by the buyer recorded with accepted prices. Rejected prices also recorded. Perceived fairness of outcomes and manifest influence of seller measured from buyers.]*

## **2. Scales used to measure perceived fairness and manifest influence:**

Perceived fairness scale (adapted from Campbell (2007)):

1. “How fair do you think the final bargaining outcome is?” on a 5-point scale (1 being very unfair and 5 very fair).
2. “How fair do you think the process of arriving at the final outcome was?” on a 5-point scale (1 being very unfair and 5 very fair).

Manifest influence scale (adapted from McFarland, Challagalla and Shervani (2006)):

1. “How much weight did you give the seller’s statements in making your decisions?” on a 5-point scale (1 being very small and 5 very large).
2. “To what extent did you go along with the seller’s suggestions?” on a 5-point scale (1 being very little and 5 very great)
3. “To what extent did the seller influence the criteria used to arrive at a price settlement?” (1 being very little and 5 very great)

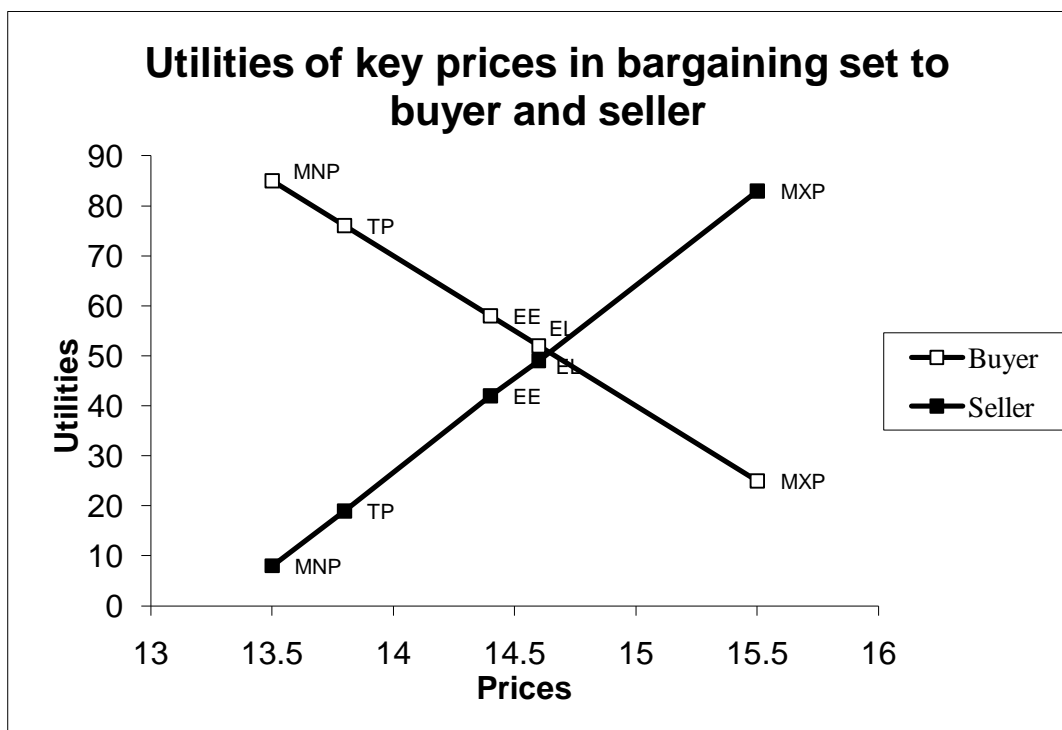
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Figure 1



**Figure 2**

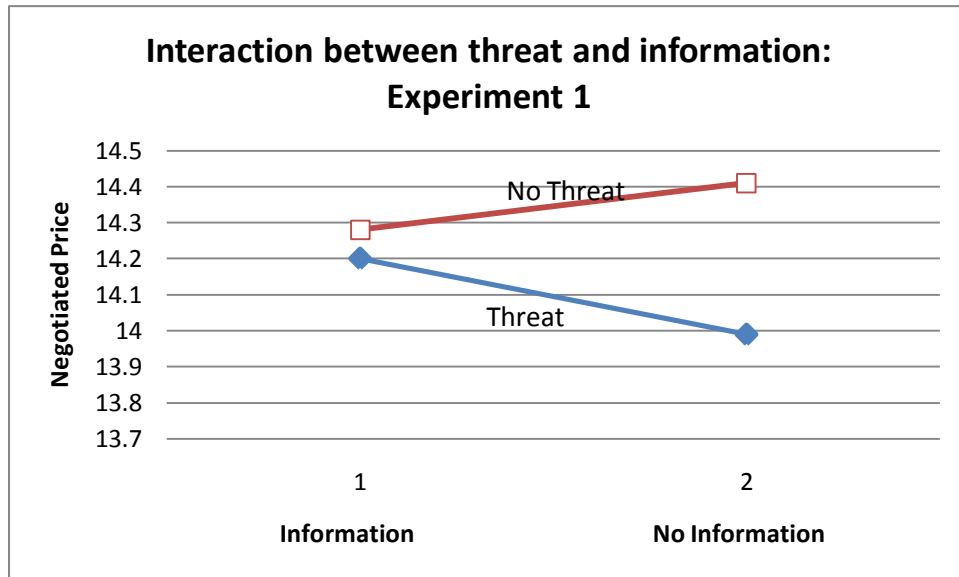


Table 1 Prices on bargaining frontier and corresponding utilities

Price points	MNP	TP	EE	RU	EL	EU	MXP
Prices (\$)	13.50	13.80	14.40	14.57	14.60	14.65	15.50
Utility Seller	8	19	42	48	49	51	83
Utility Buyer	86	76	59	53	52	51	25

Table 2: Average negotiated prices per treatment condition in Experiment 1

Sellers:

Condition	Information	No Information	Average
Threat	14.20 (n=17)	13.99 (n=13)	14.11
No Threat	14.28 (n=10)	14.41 (n=12)	14.35
Average	14.23	14.19	14.21

Buyers:

Condition	Information	No Information	Average
Threat	13.89 (n=15)	14.06 (n=15)	13.98
No Threat	14.10 (n=16)	14.41 (n=15)	14.25
Average	14.00	14.24	14.12

Table 3: Estimated effects on negotiated price: ANOVA on combined sample in experiment 1

Effect	Sums of Squares	df	Mean Square	Prob.
Threat	1.943	1	1.943	0.002*
Information	0.235	1	0.235	0.274
Buyer/Seller	0.338	1	0.338	0.190
Threat*Information	0.386	1	0.386	0.161
Info*Buyer/Seller	0.590	1	0.590	0.084
Error	20.744	107	0.194	
Total	22675	113		
Model	22654	6	3775.7	

Dependent variable: negotiated price (continuous); \* Significant at  $p < 0.05$

Table 4. Estimated effects on the EE price outcome: Combined sample in experiment 1

Effect	Estimate	Standard error	Chi-square	Prob.
EE (intrinsic effect)	0.2459	0.1209	4.35	0.04*
Threat	0.0785	0.1228	0.37	0.54
Information	0.7641	0.1224	5.89	0.02*
Seller/Buyer	0.1283	0.1227	0.83	0.42
Threat*Information	-0.3489	0.1237	3.82	0.07
Threat*Seller/Buyer	0.5329	0.1201	5.25	0.03*
Informn*Seller/Buyer	0.3128	0.1214	4.47	0.04*

Response variable: Frequency of the Equal Earnings Outcome (EE); \*  $p < .05$

Table 5: Averages for dependent variables over threat and information conditions: Experiment 2

Condition	Information	No Information	Average
Threat	14.25	13.85	14.07
	<i>4.17</i>	<i>3.00</i>	<i>3.64</i>
	<b>3.94</b>	<b>2.00</b>	<b>3.06</b>
	(n = 18)	(n = 15)	(n = 33)
No Threat	14.23	14.24	14.23
	<i>3.67</i>	<i>3.00</i>	<i>3.34</i>
	<b>4.00</b>	<b>2.79</b>	<b>3.41</b>
	(n = 15)	(n = 14)	(n = 29)
Average	14.24	14.01	
	<i>3.94</i>	<i>3.00</i>	
	<b>3.97</b>	<b>2.38</b>	
	(n = 33)	(n = 29)	

Price—regular font, Perceived fairness—*italic*, Manifest influence--**bold**

Table 6: Results of MANOVA on Experiment 2 data

Dependent variable	Source	Mean square	F	Sig.
Price negotiated	Intercept	11193.76	202411.68	.0001*
	Threat	0.507	8.346	.005*
	Information	0.605	9.956	.003*
	Threat*Information	0.649	10.686	.002*
	Corrected model	0.582	9.582	.0001*
Perceived fairness	Intercept	735.11	855.576	.0001*
	Threat	0.960	1.118	.295
	Information	12.912	15.028	.0001*
	Threat*Information	0.960	1.118	.295
	Corrected model	5.222	6.078	.001*
Manifest influence	Intercept	622.54	763.338	.0001*
	Threat	2.719	3.334	.073
	Information	38.33	46.997	.0001*
	Threat*Information	2.048	2.511	.118
	Corrected model	14.512	17.795	.0001*

\*Significant at  $p < 0.05$

Table 7: Frequencies of discrete bargaining solutions – Experiment 2

Condition	Information					No Information					Row marginal
	EU	EL	RU	EE	R5	EU	EL	RU	EE	R5*	
Threat	0	1	0	14	3	0	0	0	4	11	33
No Threat	0	0	0	11	4	1	2	2	3	6	29
Col marginal	0	1	0	25	7	1	2	2	7	17	62

\*R5= low range of prices [MNP → TP]

Table 8. Estimated effects on the EE price outcome: experiment 2

Effect	Estimate	Standard error	Chi-square	Prob.
Intrinsic value of EE	0.286	0.120	4.71	0.01*
Threat	0.070	0.124	0.36	0.43
Information.	0.819	0.122	5.89	0.01*
Threat*Information	0.274	0.124	4.02	0.05*

Dependent variable: Ratio of frequency of the Equal Earnings Outcome (EE) to frequency of least often occurring outcome (EU); \*  $p < 0.05$