Bargaining Behavior Under Price Leadership

Bilateral Monopoly*

by
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Background

Recent researches have shown the relevance of the experimental method of social psychology in testing theoretical economic models. This method of research is illustrated among the works of Siegel and Fouraker (1960), Fouraker and Siegel (1963), and Johnson and Cohen (1967).

Siegel and Fouraker (1960) have pioneered conducting experiments regarding differences in bargaining behavior under bilateral monopoly situations. These experiments show that the level of aspiration of bargainers affects their economic choice in bargaining. In 1963, Fouraker and Siegel (F-S) extended their studies in bargaining behavior to test hypotheses concerning duopoly situations. Their study on bilateral monopoly (1963) included the theoretical formulation of price leadership bilateral monopoly. In their earlier study, Fouraker and Siegel (1960) controlled experimentally three variables: (1) the amount of information available to bargainers (2) the form of bidding, and (3) the incidence of culturally enforced or prominent contracts. They intended to find out the influence of the changes in information, the number of transactions and the incidence of equal split-payoff. Considering equality and fairness as important values in American culture, equal split-payoffs is a likely market solution. Likewise, the study of Fouraker and Siegel (1963) concerning bargaining behavior included not only an equal split-payoff between seller and buyer but also

an unequal split-payoff by controlling experimentally the th
variables mentioned earlier. The latter is called an unequal stren
case wherein the seller is the price leader. Johnson and Cohen (19
duplicated and elaborated the experimental studies in bilate
monopoly and duopoly situations by interrelating economic bar
ing with the socio-cultural background of the bargainers. Th
experimental design included subjects drawn from various car
groups. These subjects were undergraduate business, MBA, law,
theology participants. It aimed to verify whether various car
groups manifested differences in the equal sharing of payof
Johnson and Cohen (1967) intended to find out also whether
socio-cultural background of bargainers has an influence
simulated economic market. They wanted to determine whether
personality characteristics and educational background under p
leadership situation influenced the bargaining behavior of
players. The results confirmed the findings of Siegel and Four
(1960) and further showed that career aspiration is a signif
factor impinging upon bargaining behavior. The subjects obta
from various career groups showed more awareness of cultu
prominence of equal split-payoffs than the general participants g
of Siegel and Fouraker (1960).

A bilateral monopoly situation may be viewed as a confl
situation wherein a seller and a buyer negotiate with one ano
either by competing, cooperating or maximizing each other (Fou
ker and Siegel, 1960 and 1963). A competitive or rivalistic barga
maximizes the difference in profits between the seller and the bu
A cooperative bargaining maximizes the bargainer's own pro
whether he is the seller or the buyer. Specifically, a price leade
bilateral monopoly is a situation wherein the seller is the price le
Hence, the buyer either takes the price offer or bids for a quan
wherein he either competes, cooperates or maximizes with the se
To what extent the seller or the buyer will manifest his bargain
likely to be a function of non-economic factors (Fouraker and Si
1963 and John and Cohen, 1967).

The study of Mclintock, Nuttin and McNul (1970) reported
opposing "strangers" play to maximize the difference in th
outcomes more frequently than friends. Other studies (Lynch, 1
Hollensteiner, 1963) concerning social interaction and econo
personalism (Anderson, 1969) in the Philippines showed the
vance of cultural background of bargainers in economic bargain
would be crucial in this study to find out as to what extent
non-economic factors affect the pattern of bargaining beh

between sellers and buyers under price leadership bilateral monopoly situation.

Considering that smooth interpersonal relationship (SIR) is a value orientation among Filipinos, (SIR model, Lynch, 1963) which implies cooperative tendencies in social interaction, it will be worthwhile finding out whether this can be manifested in economic bargaining situations.

Objectives of the Study

The present study systematically replicates price leadership bilateral monopoly of the Fouraker-Siegel study (1963) under a specific experimental treatment consisting of three variables termed as CREp. It also elaborates on the career groups used by Johnson and Cohen (1967) to find out whether the structure of the game affects the role, sex and career backgrounds of the bargainers. CREp refers to C which means complete information; R, to repeated transaction; and p, to equal split-payoff at the Pareto optimal point. In the present study, repeated transaction is adopted instead of the single transaction used by Johnson and Cohen to find out whether several transactions would further influence Filipino values such as SIR (smooth interpersonal relationship). As mentioned earlier, this SIR model of social interaction among Filipinos is likely to endorse a cooperative bargaining behavior.

The present study aims to find out the following:

(1) The price leadership bilateral monopoly solution among occupational groups;

(2) The pattern of bargaining behavior between sellers and buyers from all occupational groups;

(3) The pattern of bargaining behavior between sellers and buyers from each occupational group; and

(4) The influence of role, sex and occupational groupings of bargainers in bargaining behavior.

Economic Theoretical Framework

Equal Strength Case

Several questions are asked whether the solution for negotiating a bargaining contract between the seller and the buyer is determinate

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or indeterminate. It will be worthwhile finding out the influence of non-economic factors in this problem despite controversial issues raised within the economic context.

A bilateral monopoly situation is likely to be negotiated in accordance to two institutional arrangements: (1) Equal-Strength Case and (2) Unequal-Strength Case. The first negotiation is arranged such that the seller and the buyer receive an equal profit in terms of price and quantity. The solution for this negotiation is called Pareto (P_p, Q_p) wherein P_p is the Pareto price and Q_p is the Pareto quantity. As indicated in Figure 1, the bargainers will maximize their joint profits at the interaction between the seller's marginal cost (MC) and the buyer's marginal revenue (MP) as shown by the studies of Hicks (1935); Fellner (1947, 1949) and Fouraker (1957). Studies concerning Pareto optimal quantity (Pq) confirm that it is determinate as the studies of Pigou (1908); Schumpeter (1928); Fellner (1947); Stigler (1952) show. However findings of Bowley (1928) and Marshall (1890) show that the Pareto optimal quantity is indeterminate.
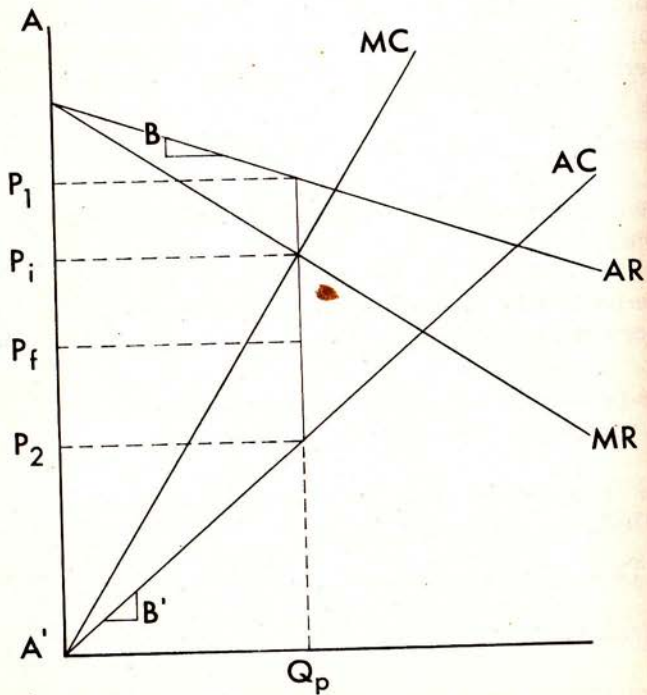

Figure 1: S-F Equal Strength Case

studies concerning Pareto price (P_p) solution conclude that the contract is towards an equal division of the joint payoff according to von (1908); Nash (1950); Raiffa (1953); Hicks (1935); and Zeuthen (1930). The extent of indeterminateness of the Pareto optimal price is labelled P_1 and P_2 in Figure 1. However, the actual price depends upon the relative bargaining strength of the seller and the buyer (Fellner, 1947).

The above-mentioned studies confirm the determinateness of price and quantity despite the predictions of the contrary such as Bowley (1908) and Marshall (1890).

On the other hand, Siegel and Fouraker (1960) set the midpoint of the Paretian contract under equal strength bilateral monopoly (P_p). They assert that Fellner's analysis (1947) implies an equal split of the optimal payoff which they call "Fellner's hypothesis." This assumes that the relative bargaining strength among the buyers and the sellers is randomly distributed (as obtained from a random selection of a sufficiently large number of bargainers randomly paired). Fouraker and Siegel (1963) describe the solution of the cases mentioned earlier towards an equal division of the joint payoff (a price midpoint of P_1 and P_2) as cooperative decision making of which the price and quantity are determinate towards Pareto optimal solution.

Some economists (Boulding, 1950; Fouraker, 1957) consider the price established by the intersection of the marginal functions (P_i) as the determinate solution. It is clear from Figure 1 that this price is within the (P_1, P_2) range and equal to the midpoint price (P_f) if, and only if, the absolute values of the slopes of the seller's average cost (linear) function and the buyer's average revenue (linear) function are the same. Siegel and Fouraker call this marginal intersections hypothesis.

The discussion above can be formally described as follows starting from F-S, 1963:

Let the buyer's demand curve be a linear function

$$\frac{R}{Q} = A - BQ \qquad (2.1)$$

Let the seller's linear average cost function be

$$\frac{C}{Q} = A' + B'Q \qquad (2.2)$$

where C = total cost, R = total revenue, and Q = quantity

then $\quad R = AQ - BQ^2 \qquad (2.3)$

and $\quad C = A'Q + B'Q^2 \qquad (2.4)$

Note that A, B, A' and B' are the parameters of the average cost and average revenue functions.

Joint profit of the buyer and seller is

$$\pi b + \pi s = (R - PQ) + (PQ - C)$$

$$= R - C$$

$$= AQ - BQ^2 - A'Q - B'Q^2 \qquad (2.5)$$

Setting the first derivative of (2.5) to zero gives the Pareto optimal quantity provided the second derivative is negative:[1]

$$\frac{d(\pi b + \pi s)}{dQ} = A - 2BQ - A' - 2B'Q = 0 \qquad (2.6)$$

$$A - A' = (2B' + 2B)Q \qquad (2.7)$$

$$Q_p = \frac{A - A'}{2(B' + B)} \qquad (2.8)$$

Hence, Q_p is the quantity which maximizes joint profit.

Substituting (2.6) into Q of the first derivative of (2.2) which is MR and equating it to P leads to the "marginal intersection" price (P_i):

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[1] The second derivative of the profit function is negative if the rate of change of the marginal revenue of the buyer is less than the rate of change of the marginal cost of the seller. A simple calculation of (2.5) will show that the second derivative results in:

$$\frac{d\pi^*}{dQ^2} = -2B - 2B' < 0$$

$$P_i = \frac{AB' + A'B}{B + B'} \tag{2.9}$$

The "midpoint" price, P_f, can be obtained as:[2]

$$P_f = \frac{3\,AB + 3A'B + AB + A'B}{4(B' + B)} \tag{3.0}$$

From (2.9) and (3.0), it is clear that if $B = B'$

then $P_i = P_f = \dfrac{A + A'}{2}$ \hfill (3.1)

Siegel and Fouraker (1960) seek to determine experimentally which of the two hypotheses holds true under an equal strength bilateral monopoly situation. Their negotiations are conducted as follows: One party would either accept the proposal or make a counter offer. Most pairs of buyers and sellers succeed in arriving at a contract after protracted negotiations. The central tendency of such contracts is found to be toward the quantity which maximizes joint profits and to the price which divides joint profits equally, thus "conforming" to the "Fellner hypothesis."

Unequal-strength Case: Price Leadership Bilateral Monopoly

Unlike the negotiation under equal strength case, the unequal-strength case assumes that the seller is the price leader. The buyer chooses a quantity in exchange for the price offered to him by the seller. Assuming that each party seeks to maximize his individual profit, the buyer's profits in this case is defined as (F-S, 1963; Gulzon, 1972)

$$\pi b = R - PQ$$

$$= AQ - BQ^2 - PQ \tag{3.2}$$

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[2] Noting that, $P_1 = AR = A - BQ = A - B \cdot \dfrac{A - A'}{2(B' + B)}$

$$= \frac{2\,AB' + AB + A'B}{2(B' + B)}$$

and $P_2 = AC = A' + B'Q = A' + B' \dfrac{A - A'}{2(B' + B)} = \dfrac{2A'B + AB' + A'B'}{2(B' + B)}$,

then $P_f = \dfrac{P_1 + P_2}{2} = \dfrac{3AB + 3A'B + AB + A'B}{4(B' + B)}$

where P is the price set by the seller and Q is the quantity selected by the buyer. The buyer's profits, within the constraints of the established price, are maximized when he selects a quantity so that the first derivative of Equation (3.2) is zero, provided the second derivative is negative, i.e.,

$$\frac{d\pi b}{dQ} = A - 2BQ - P = 0$$

from which $Q = \frac{A - P}{2B}$. (3.3)

This adjustment equates the buyer's marginal revenue $(A - 2BQ)$ with his marginal cost (P). The seller's profit is defined as

$$\pi s = PQ - C$$

$$= PQ - A'Q - B'Q^2$$ (3.4)

It is assumed that the seller either knows or will discover that the buyer's quantity selection will be as indicated in Equation (3.3). Substituting this value for Q in Equation (3.4), the seller's profit is

$$\pi s = \frac{1}{2B} (AP - P^2 - A'A + A'P - \frac{B'A^2}{2B} - \frac{AB'P}{B} - \frac{B'P^2}{2B})(3.5)$$

To derive the profit-maximizing price choice, take the first derivative of πs with respect to P, equate this function to zero, and solve for P (noting that the second derivative is negative). That is,

$$\frac{d\pi s}{dP} = \frac{1}{2B} (A - 2P + A' + \frac{AB'}{B} - \frac{B'P}{B}) = 0$$ (3.6)

Since $1/2 B > 0$, the Bowley price is

$$P_b = \frac{AB + A'B + AB'}{2B + B'}$$ (3.7)

If the seller chooses this price, the buyer will respond with the Bowley quantity selection of

$$Q_b = \frac{A - A'}{2B' + 4B}$$ (3.8)

which is less than the Paretian quantity as given by (2.8).

The bargaining parties reaching an agreement at the Bowley point can improve their joint profits by moving to the Paretian contract curve. This possibility leads Fellner (1947) to reject the Bowley point in favor of the Paretian solution. Siegel and Fouraker (1963) consider this Paretian contract, as a basis for an alternative hypothesis to the Bowley contract (P_b, Q_b).

The Pareto and Bowley contracts for the case where $B = B'$ may be summarized in Figure 2 below, quoting from Fouraker and Siegel (1963):

Figure 2: Fouraker-Siegel Unequal Strength Case

The seller, in the role of the price leader, assumes that the buyer will choose the quantity determined by the intersection of the established price and the buyer's marginal revenue

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function, according to the Bowley model. The seller considers mr as the demand confronting his concern and maximizes by choosing the price, P_b, since the resulting quantity Q_b is associated with the intersection of his marginal cost and what he considers to be his marginal revenue mmr (this function is marginal to the marginal revenue curve).

If the buyer always maximizes in response to a price quotation (i.e., chooses a contract that is mr), the most favorable contract to the seller is P_b, Q_b, where mr is tangent to the highest feasible iso-profit curve of the seller S_2. This solution results in a profit to the buyer associated with his iso-profit curve B_1. It would be possible for both buyer and seller to move to more favorable iso-profit curves if they could exchange Q_p at some price in the subset cb of the Paretian optimal set of prices ad.

An alternative solution is (P_p, Q_p), the contract which yields an equal division of maximum joint profits, indicated by the intersection of the marginal functions in this example. This is a quasi-equilibrium point, for the iso-profit curves S_1 and B_2 are tangent at P_p, (which is also equal to P_f, Q_p) and have slopes of zero at the point of tangency. If the seller quotes P_p, the buyer responds with Q_p, which is the best choice for both parties, given that P_p, has been chosen. Note that the minima of the seller's iso-profit curves generate his marginal revenue function.

The parameters for P_b, Q_b (15, 12) and P_p, Q_p (9, 18) were modified from Bowley and Pareto solution respectively.[3] The structure of the model was such that the seller obtained P1.27 per bid and the buyer obtained P1.00 per bid.

Other changes made are the following: (1) a new profit table is

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[3] Fellner's "midpoint" price, P_f, is equal to S-F "marginal intersection" price, P_i, as shown in (2.9).

At P_p, Q_p, there is an equal split-payoff where $\pi b = \pi s = 162$. These figures are included in the appendix for profit table with appropriate transformations. Transformations used in the profit table for fifteen transactions for

$$\pi b = 5\,\pi b + 190; \quad \pi s = 5\,\pi s + 190$$

The profit table is modified to determine the amount for equal-split payoff in accordance to Philippine monetary values.

derived by changing the parameters A, A', B and B' to determine the amount for equal-split payoff in accordance to Philippine values;[4] and (2) the total number of transactions is reduced from twenty four (three trials, nineteen regular transactions, one final transaction, one special final transaction) to twelve, since business executive are included in the sampling.[5]

For each experiment in the series, each subject is asked not to divulge the nature of the study for doing so might invalidate the entire study.

Experimental Method[6]

The experiment uses the structure of bargaining transactions among pairs of seller and buyer. A pair consists of a seller and a buyer. They are separated from one another in the cubicle and the negotiations between them are mediated by an experimenter through writing. The regular transaction is repeated ten times besides the special and final transaction. This is based on a profit table from which the seller quotes a price and the buyer subsequently quotes a corresponding quantity as shown in Exhibit 8. The profits obtained by the seller and buyer are given in actual amount of money.

Derivation of Profit Table

The profit table in Exhibit 8 indicates that the levels of profit in accordance with the index of bargaining behavior which is defined as follows:

Seller's Index: $1s = \sum_{i=1}^{10} (P_i - 15)$ where, if the index is positive, the seller has sent rivalistic signals to his buyer; if negative, the seller has sent cooperative signals to his buyer; and if zero, the seller has behaved on balance as a simple maximizer.

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[4] Where A = 27, A' = -9, B = 0.5, B' = 0.5

[5] Siegel and Harnett's (1961) study on business executives reduce also the total number of transactions from twenty to fourteen. This does not make any difference in their findings compared with F-S (1963). In this study, the same total number of transactions are given to all groups to have a uniform treatment for all.

[6] The interested reader may refer further to Cuizon 1972, pp. 110-113.

Buyer's Index: $1b = \sum_{i=1}^{10} (Q_i - Q_m)$ where, if this index is positive, the buyer has sent cooperative signals to the seller; if negative, the buyer has sent rivalistic signals to his seller; and if zero, the buyer has responded as a simple maximizer to the seller.

Results and Discussion

The analysis in Exhibit 3 shows that the sellers' game have a higher proportion of cooperative bargaining behavior and buyers have a higher proportion of rivalistic bargaining behavior (46.25%) as their respective bargaining strategy. It would be interesting to find out in the later analysis whether this is influenced by the structural game wherein the seller is the price leader or whether it is really a function of intrinsic personality configuration.

The proportions of the three types of bargaining behavior such as rivalistic (R), cooperative (C) and maximizing (M) differ per occupational grouping as shown in Exhibit 4. Proportions of C show that AS females rank first (76.92%) followed by Law male (61.54%) and by executive males (50.00%). Proportions of RR show that Education makes rank first (61.54%) whereas the AS males rank second (42.85%).

The results in Exhibit 4 indicate that the frequency distribution between sellers' and buyers' bargaining behavior differ among occupational groups. Among the sellers, AS females rank first in occurrence for C. However, Graduate Education females rank higher (76.92%) in occurrence for R among the sellers. The AS females rank first in R among all buyers. The executive males rank first among the male buyers.

It was only the Graduate Education males who obtained the highest frequencies for M among the sellers and the buyers.

Further statistical verification will show whether sex plays an influential factor in bargaining behavior as indicated in the above mentioned findings.

Generally, the trend shows that differences in bargaining behavior can be attributed to differences in occupational background of the bargainers as supplied in Exhibits 2, 3, and 4.

Analysis of Price Leadership Solution: Analysis of the Tenth Transactions

A binomial test is used to check the hypothesis concerning price leadership bilateral monopoly under the tenth regular transaction of price and quantity as shown in Exhibit 5. The tenth regular transaction is analyzed since it is the last transaction (Fouraker and Siegel, 1963). The entire data for bargaining pairs in each group are presented in Appendix A (Cuizon, 1972) for further reference. The result in Exhibit 6 show that the contract for Executive males, AS males and females is towards the Pareto solution according to a binomial test (p =.6, where the null hypothesis is rejected at the .05 level). The result of other groups such as Education males and females and Law males is not significant against the null hypothesis (p = .6 as the alternative hypothesis was significant at .05 level). However, it does not necessarily imply that the solution of the latter group is Bowley. It probably indicates that factors other than price leadership bilateral monopoly situation affect the solution, such as occupational background and other personality differences of bargainers.

Influence of Roles, Sexes and Occupational Groupings

The result of the analysis of variable in Exhibit 6 show that the main effects between sexes and the interaction between roles and sexes are not significant (p < .05) in bargaining behavior. The result in Exhibit 7 indicates that the main effects among occupational groupings and the interaction between roles and occupational groupings are not significant (p < .05) in bargaining behavior. Finally, the result demonstrates that roles has significantly (p < .05) influence behavior under price leadership bilateral monopoly.

Conclusions

This study has demonstrated the relevance of non-economic factors to price leadership bilateral monopoly behavior. Some of the findings in the descriptive analyses are the difference in bargaining behavior among occupational groupings and the preponderance of R and RR bargaining type distributions among the bargainers. It is noted that the role and occupational groupings very highly influence the bargaining behavior (R) in economic bargaining. Sex differences are not significant. Likewise, the structure of the game only affects the result as shown in the analyses.

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The personality configuration of the Filipino bargainers can not be manifested since their respective role as a seller or buyer induces the bargainer to adopt it as a strategy in influencing the opponent to decide for a mutually advantageous profit. This finding demonstrates the generality of Fouraker's and Siegel's (1963) corollary proposition that the buyer has the tendency to be realistic in adopting a strategy to lower the level of aspiration of the seller. This finding of the present study confirms the findings of Johnson and Cohen (1967) despite the difference in the nature of transactions. The latter use single transaction whereas the former uses repeated transaction under a price leadership situation.

Nonsignificance of sex might be partly attributed to lack of non-economic information concerning the background of the opponent. The bargainers might play strangers "to maximize the difference between their own and the other's outcomes more frequently than friends," (McClintock et al., 1970). For further study, it should be interesting to find out the effect of giving additional information concerning the opponents' sex. Will sex be still significant?

The above-mentioned findings might also be attributed to the situational context in which the decision making occurs (Feather, 1969). This is partly a function of the manipulated experimental treatment under price leadership bilateral monopoly. What will be the effect of non-economic information on price leadership bilateral monopoly if the information given concerns the background of bargainers besides CREp? What will be the effect if the bargainers were not isolated from one another? It will be interesting to find out the dynamics of communication under repeated transactions. What the implication of a conflict resolution as illustrated under a bilateral monopolistic situation? A cross-cultural approach concerning conflict resolution similar to a bilateral monopolistic situation might give more information concerning international conflicts. The Siegel and Fouraker study (1960) on equal strength-case show that American resolve their conflict through cooperative negotiation under single transaction.

Generally, it would be worthwhile to investigate further the type of bargaining behavior manifested under equal strength case (equal bargaining strength between a seller or a buyer). This may be done if complete information is given concerning the seller's and buyer's profit and the specific non-economic background of the seller and

the buyer. It would be interesting to find out if the investigation leads to repeated transactions and equal split payoff at the Paretian optimal point under bilateral monopoly.

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EXHIBIT 1

Indices of Bargaining Behavior

	Executive Males					AS Males					AS Females			
Pair	Is	Ib	Seller Type	Buyer Type	Pair	Is	Ib	Seller Type	Buyer Type	Pair	Is	Ib	Seller Type	Buyer Type
1	−8	0	C	M	13	−43	−108	C	R	27	−11	−17	C	R
2	−40	−24	C	R	14	−54	0	C	M	28	−32	−30	C	R
3	−55	−61	C	R	15	3	−1	R	R	29	−2	0	C	M
4	−56	−79	C	R	16	40	−39	R	R	30	15	−61	R	R
5	−61	−39	C	R	17	−53	−29	C	R	31	−13	−56	C	R
6	−21	−87	C	R	18	−18	−29	C	R	32	−15	−10	C	R
7	12	−53	R	R	19	−13	0	C	M	33	−3	−4	C	R
8	33	−5	R	R	20	24	−129	R	R	34	−11	−87	C	R
9	5	0	R	M	21	40	−76	R	R	35	19	−82	R	R
10	7	−46	R	R	22	27	−83	R	R	36	−50	−91	C	R
11	−25	−64	C	R	23	−43	−36	C	R	37	−40	−68	C	R
12	26	−81	R	R	24	5	0	R	M	38	−15	−20	C	R
					25	33	−68	R	R	39	−1	87	C	R
					26	30	1	C	C					
Total	183	−539				367	−597				159	−613		

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	Educ. Females					Educ. Males					Law			
Pair	Is	Ib	Seller Type	Buyer Type	Pair	Is	Ib	Seller Type	Buyer Type	Pair	Is	Ib	Seller Type	Buyer Type
40	−6	7	R	C	53	18	−57	R	R	67	−9	1	C	C
41	28	−50	R	R	54	−60	−41	C	R	68	−35	−2	C	R
42	1	−27	R	R	55	−7	−110	C	R	69	−2	−50	C	R
43	−49	−55	C	R	56	−17	59	C	R	70	−7	9	C	C
44	40	−1	R	R	57	4	−12	R	R	71	18	−8	R	R
45	38	−32	R	R	58	1	0	R	M	72	−57	−50	C	R
46	1	−19	R	R	59	0	0	M	M	73	3	0	R	M
47	29	13	R	C	60	−5	−16	C	R	74	−31	−58	C	R
48	−11	−77	C	R	61	21	12	R	C	75	−36	−59	C	R
49	7	−70	R	R	62	−32	−22	C	R	76	−49	−54	C	R
50	−37	−42	C	R	63	7	0	R	M	77	−34	−63	C	R
51	3	−3	R	R	64	15	−52	R	R	78	−44	−18	C	R
52	13	−75	R	R	65	1	0	C	M	79	11	−1	R	R
					66	5	27	R	C	80	−60	3	C	C
Total	54	−431				51	−330				332	−350		

EXHIBIT 2

Distribution of Different Combination of Bargaining
Strategies Adopted by the Entire Population

Combinations*	Frequency	Percentage Distribution
CR	39	46.15
RR	20	30.00
CM	4	6.30
RM	5	5.00
CC	5	6.30
MM	2	5.00
MC	1	1.35

*The first symbol represents the seller; the second, the buyer. Four
pairs had no response.

M — simple maximizer
R — rivalist
C — cooperator

Sellers

	Executive Males Sellers	%	AS Males Sellers	%	AS Females Sellers	%	Grad. Educ. Females Sellers	%	Grad. Educ. Males Sellers	%	Law Males Sellers	%
N	12		14		13		13		14		14	
C	7	58.34	7	50.00	11	84.61	3	23.08	6	42.85	11	78.58
R	5	41.66	7	50.00	2	15.39	10	76.92	7	50.00	3	21.42
M	0	0	0	0	0	0	0	0	1	7.15	0	0

Buyers

	Executive Males Buyers	%	AS Males Buyers	%	AS Females Buyers	%	Grad. Educ. Females Buyers	%	Grad. Educ. Males Buyers	%	Law Males Buyers	%
N	12		14		13		13		14		14	
C	0	0	1	7.14	0	0	2	15.38	2	14.29	3	21.43
R	10	83.34	10	71.42	12	93.31	11	84.62	8	57.14	10	71.43
M	2	16.66	3	21.44	1	7.69	0	0	4	28.57	1	7.14

Totals

	Executive Males	AS Males	AS Females	Grad. Educ. Females	Grad. Educ. Males	Law Males
N	24	28	26	26	28	28
C	7	8	11	5	10	14
R	15	17	14	21	13	13
M	2	3	1	0	5	1

*The first symbol represents the seller; the second, the buyer.

Key: M = simple maximizer
R = rivalist
C = cooperator

EXHIBIT 4

Percentage Distribution of Various Occupational
Groups Adopting Different Combinations of
Bargaining Strategies

Combination*	Exec. Males	AS Males	AS Females	Educ. Females	Educ. Males	Lay Males
CR	50.00	28.58	76.92	23.56	35.73	07.18
RR	33.34	42.86	15.38	61.34	21.43	14.06
CM	8.33	14.28	7.70		7.14	
RC				15.10	14.28	
RM	8.33	7.14			14.28	7.18
CC		7.14				21.00
MM					7.14	
MC						
MR						

*The first symbol represents the seller; the second, the buyer.

Key: M - simple maximizer
     R - rivalist
     C - cooperator

Price and Quantity Agreed Upon for the Tenth Transaction

	Executive Males				As Males				As Females		
Pair	Price	Quan.	Sol.	Pair	Price	Quan.	Sol.	Pair	Price	Quan.	Sol.
1	8	19	P	13	10	2	P	27	13	11	B
2	16	6	B	14	11	16	P	28	9	22	P
3	11	7	P	15	16	11	B	29	17	11	B
4	9	18	P	16	9	18	P	30	11	17	P
5	7	22	P	17	9	18	P	31	19	1	B
6	8	11	P	18	11	16	P	32	16	9	B
7	19	1	B	19	15	12	B	33	19	8	B
8	19	8	B	20	16	12	B	34	9	18	P
9	15	12	B	21	19	0	B	35	18	3	B
10	13	13	B	22	19	1	B	36	19	2	B
11	9	18	P	23	15	12	P	37	9	10	P
12	19	1	B	24	18	9	B	38	10	17	P
13				25	18	4	B	39	18	1	B
14				26	19	8	B				
Mean	12.75	13.00			14.64	9.92			14.46	10.00	
Median	12.00	11.55			15.55	11.55			16.00	10.00	
$P_{Computed}$	.33515				.05733				.09761		

Con't of EXHIBIT 5

	Grad. Educ. Females				Grad. Educ. Males				Law Males		
Pair	Price	Quan.	Sol.	Pair	Price	Quan.	Sol.	Pair	Price	Quan.	Sol.
40	12	6	B,P	53	13	5	B	67	17	10	B
41	15	6	B	54	7	21	P	68	14	11	B
42	19	12	B	55	19	1	B	69	1	22	P
43	9	16	P	56	15	1	B	70	14	12	B
44	19	9	B	57	16	11	B	71	19	8	B
45	19	9	B	58	19	8	B	72	7	21	P
46	9	18	P	59	15	12	B	73	15	13	B
47	19	15	B	60	17	8	B	74	19	1	B
48	19	0	B	61	18	22	P	75	7	22	P,B
49	9	18	P	62	10	20	P	76	10	12	B
50	15	17	B,P	63	15	12	B	77	17	1	B
51	14	13	B	64	19	1	B	78	19	8	B
52	15	2	B	65	14	13	B	79	14	14	B
				66	11	21	P	80	19	8	B
Mean	14.84	11.61			14.85	11.14			13.71	11.71	
Median	15.00	13.00			15.00	11.55			14.55	11.55	

P Computed .03156   .01685   .01685

2 (Role) x 2 (Sex) Analysis of Variance for Y

Source of Variation	df	Sum of Squares	M.S.	F
Role	1	0.42144	0.4214	3.244**
Sex	1	0.00312	0.00312	n.s.
Interaction	1	0.01927	0.01927	n.s.
Error	100	5.11203	0.05112	

$F(1,100).05 = 3.946$ **$F(1,100).01 = 6.93$ **$p < .01$

EXHIBIT 7

2 (Role) x 2 (Occupational Grouping) Analysis of Variance for Y

Source of Variation	df	Sum of Squares	M.S.	F
Role	1	0.83705	0.83705	32.207**
Occupational Grouping	3	0.16427	0.05476	2.107 n.s.
Interaction	3	0.19604	0.06535	2.514 n.s.
Error	88	2.28728	0.02599	

$F(1,88).05 = 3.96$ $F(3,88).05 = 2.72$ $F(1,88).01 = 6.96$

EXHIBIT 8

Profit Table

Price	B/S	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	B	0	318	440	558	670	778	880	978	1070	1158	1240	1318	1390	1458	1520	1578	1630	1678	1720	1758	1790	1818	1840
	S	0	238	280	318	350	378	400	418	430	438	440	438	430	418	400	378	350	318	280	238	190	138	80
2	B	0	312	430	542	650	752	850	942	1030	1112	1190	1262	1330	1392	1450	1502	1550	1592	1630	1662	1690	1712	1730
	S	0	242	290	332	370	402	430	452	470	482	490	492	490	482	470	452	430	402	370	332	290	242	190
3	B	0	308	420	528	630	728	820	908	990	1068	1140	1208	1270	1328	1380	1428	1470	1508	1540	1568	1590	1608	1620
	S	0	248	300	348	390	428	460	488	510	528	540	548	550	548	540	528	510	488	460	428	390	348	300
4	B	0	302	410	512	610	702	790	872	950	1022	1090	1152	1210	1262	1310	1352	1390	1422	1450	1472	1490	1502	1510
	S	0	252	310	362	410	452	490	522	550	572	590	602	610	612	610	602	590	572	550	522	490	452	410
5	B	0	298	400	498	590	678	760	838	910	978	1040	1098	1150	1198	1240	1278	1310	1338	1360	1378	1390	1398	1400
	S	0	258	320	378	430	478	520	558	590	618	640	658	670	678	680	678	670	658	640	618	590	558	520
6	B	0	292	390	482	570	652	730	802	870	932	990	1042	1090	1132	1170	1202	1230	1252	1270	1282	1290	1292	1290
	S	0	262	330	392	450	502	550	592	630	662	690	712	730	742	750	752	750	742	730	712	690	662	630
7	B	0	288	380	468	550	628	700	768	830	888	940	988	1030	1068	1100	1128	1150	1168	1180	1188	1190	1188	1180
	S	0	268	340	408	470	528	580	628	670	708	740	768	790	808	820	828	830	828	820	808	790	768	740
8	B	0	282	370	452	530	602	670	732	790	842	890	932	970	1002	1030	1052	1070	1082	1090	1092	1090	1082	1070
	S	0	272	350	422	490	552	610	662	710	752	790	822	850	872	890	902	910	912	910	902	890	872	850
9	B	0	278	360	438	510	578	640	698	750	798	840	878	910	938	960	978	990	998	1000	998	990	978	960
	S	0	278	360	438	510	578	640	698	750	798	840	878	910	938	960	978	990	998	1000	998	990	978	960
10	B	0	272	350	422	490	552	610	662	710	753	790	822	850	872	890	902	910	912	910	902	890	872	850
	S	0	272	350	422	490	552	610	662	710	753	790	822	850	872	890	902	910	912	910	902	890	872	850

Quantity

Price		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
11	B	0	268	340	408	470	528	580	628	670	708	740	768	790	808	820	828	830	828	820	808	790	768	740
	S	0	288	380	468	550	628	700	768	830	888	940	988	1030	1068	1100	1128	1150	1168	1180	1188	1190	1188	1180
12	B	0	262	330	392	450	502	550	592	630	662	690	712	730	742	750	752	750	742	730	712	690	662	630
	S	0	292	390	482	570	652	730	802	870	932	990	1042	1090	1132	1170	1202	1230	1252	1270	1282	1290	1292	1290
13	B	0	258	320	378	430	478	520	558	590	618	640	658	670	678	680	678	670	658	640	618	590	558	520
	S	0	298	400	498	590	678	760	838	910	978	1040	1098	1150	1198	1240	1278	1310	1338	1360	1378	1390	1398	1400
14	B	0	252	310	362	410	452	490	522	550	572	590	602	610	612	610	602	590	572	550	522	490	452	410
	S	0	302	410	512	610	702	790	872	950	1022	1090	1152	1210	1262	1310	1352	1390	1422	1450	1472	1490	1502	1510
15	B	0	248	300	348	390	428	460	488	510	528	540	548	550	548	540	528	510	488	460	428	390	348	300
	S	0	308	420	528	630	728	820	908	990	1068	1140	1208	1270	1328	1380	1428	1470	1508	1540	1568	1590	1608	1620
16	B	0	242	290	332	370	402	430	452	470	482	490	492	490	482	470	452	430	402	370	332	290	242	190
	S	0	312	430	542	650	752	850	942	1030	1112	1190	1262	1330	1392	1450	1502	1550	1592	1630	1662	1690	1712	1730
17	B	0	238	280	318	350	378	400	418	430	438	440	438	430	418	400	378	350	318	280	238	190	138	80
	S	0	318	440	558	670	778	880	978	1070	1158	1240	1318	1390	1458	1520	1578	1630	1678	1720	1758	1790	1818	1840
18	B	0	232	270	302	330	352	370	382	390	392	390	382	370	352	330	302	270	232	190	142	90	32	-30
	S	0	322	450	572	690	802	910	1012	1110	1202	1290	1372	1450	1522	1590	1652	1710	1762	1810	1852	1890	1922	1950
19	B	0	228	260	288	310	328	340	348	360	348	340	328	310	288	260	228	190	138	100	48	-10	-78	-140
	S	0	328	460	588	710	828	940	1048	1150	1248	1340	1428	1510	1588	1660	1728	1790	1848	1900	1948	1990	2028	2060

Key: B - profit to buyer
      S - profit to seller

*The profit figures are in tenths of centavos. For example, the profit figure of 318 for the buyer in the first cell (price = 1, quantity = 1) means P0.318.