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MANUFACTURERS AND RETAILERS: A NEGOTIATION GAME FOR BEGINNING MANAGEMENT STUDENTS

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For some time we have been experimenting at Clarkson College with simulation games for freshmen in our introductory course in business. Building up a good attitude towards future management courses is one of the chief objectives of the course. Other objectives, such as exposing the students to a variety of business problems and introducing them to the dynamic quality of inter-personal relationships in a business setting, are obviously well accomplished through simulation. However, it was the enthusiastic reception given to the games played in earlier years that led us to schedule a two-hour laboratory gaming period each week for the course this fall.

Although formal student evaluations of the course will not take place until after this is being written, preliminary indications are that the weekly gaming sessions are a high point in the week for the students and we are thoroughly pleased with the student reaction to the course. The games used are those contained in Introduction to Business Simulation - Frazer (i) published by Reston Publishing Company. The variety of situations found in these games and variety of types of skills needed to be successful have kept student interest at a high level throughout the course.

The games played are some combination of three main categories:

1. Management science type games in which the students must select from among alternatives to try to get a good result but in which the decisions of the other teams do not affect that result.
2. Competitive type games in which the students make policy decisions such as pricing in which the results of a decision are affected by the decisions made by other teams.
3. Negotiation games in which the most important decision is a negotiated bargain made between two competing teams.

This paper describes a negotiation game, Manufacturers and Retailers, and discusses the results secured with it in the course this fall. The writeup of the game as given in the book the students have follows.

MANUFACTURERS AND RETAILERS

Manufacturers and Retailers is a game in which the critical decision is the price at which the manufacturer sells to

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the retailer. This is determined by direct negotiation between the involved parties and thus the game is primarily a negotiation game rather than being a game in which keen analysis is the primary determinant of success.

The product manufactured in this game is an “AH-OO-GAH” horn, which many people enjoy adding to their car to give a distinctive optional horn noise in addition to their regular horn. While the “AH-OO-GAH” horn is a popular item, it is strictly an extra and when the retail price charged for it goes over \$40, virtually no horns are bought by consumers. The retailers buy horns from the manufacturers and resell them to the consumers. Thus the price at which a manufacturer sells to a retailer is both an income to the manufacturer and a cost to the retailer, meaning that each has a different viewpoint about what the manufacturer’s price should be.

Manufacturers

Each manufacturer has \$20,000 in fixed cost each quarter, and a variable cost of \$10 per horn. Income for the manufacturer comes from the sales negotiated to the retailers. Sales to retailers are negotiated in advance of production and each manufacturer makes exactly the amount he needs to cover his sales.

Retailers

Each retailer has a fixed cost of \$5000 per quarter, which covers all costs other than the cost of purchasing the horns from the manufacturers. The demand for horns experienced by a retailer is based upon both the previous quarter’s sales and the price charged, according to the following equation:

$$\text{POT. SALES} = 1/3(\text{PREV. QUARTER'S SALES}) + 4000 - 100(\text{PRICE}) \quad (1)$$

Price can never be over \$40. Actual sales will be either the potential sales or the amount purchased by the retailer from the manufacturers, whichever is the smallest. If a retailer buys more horns from the manufacturers than he sells, the extra horns are sold off for him as surplus at a price of \$10.

Method of Play

There can be up to four manufacturers in the game and there will always be two retailers for each manufacturer. In a typical game there will be two manufacturers and thus four retailers. Each quarter there will be a negotiation period during which manufacturers negotiate sales to retailers. These will be submitted on Decision Form 1, with representatives of both the manufacturer and the retailer signing the

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form to ensure that there has been agreement on both the quantity and the price. These sales decisions should be submitted as soon as they are negotiated, and all sales decisions must be submitted by the end of the negotiation period. After the negotiation period is over, the retailers will then submit their decision about the price they are charging on Decision Form 2. Result; will be calculated and returned and negotiations for the next period will then begin.

As the game begins, it is assumed that each retailer had sales the previous quarter of 3000 units. A typical game played for one class period will last for only 5 quarters, because the negotiation period necessarily takes an appreciable amount of time. In some instances two class periods may be allotted to playing the game, in which case some 12 quarters can be played.

Sample Calculations

These calculations are based on there being two manufacturers and four retailers, with the manufacturers being Teams 1 and 2, and the retailers being Teams 3, 4, 5 and 6. There are no restrictions on which retailers manufacturers can sell to.

Assume the following sales are negotiated in Quarter 1.

Team 1	sells	Team 3	3000	horns at a price of	\$15
Team 1	sells	Team 4	3000	horns at a price of	\$15
Team 2	sells	Team 5	3200	horns at a price of	\$13
Team 2	sells	Team 6	1600	horns at a price of	\$24

Following the negotiation period

Team 3 sets a retail price of \$20
 Team 4 sets a retail price of \$20
 Team 5 sets a retail price of \$17
 Team 6 sets a retail price of \$35

These decisions will give the following results:

<u>TEAM</u>	<u>POT. SALES</u>	<u>PURCH.</u>	<u>SALES</u>	<u>FIXED COST</u>	<u>VAR. COST</u>	<u>INCOME</u>	<u>PROFIT</u>
1	---	---	6000	20000	60000	90000	10000
2	---	---	4800	20000	48000	80000	12000
3	3000	3000	3000	5000	45000	60000	10000
4	3000	3000	3000	5000	45000	60000	10000
5	3300	3200	3200	5000	41600	54400	7800
6	1500	1600	1500	5000	38400	53500	10100

Analyzing Team 2, a manufacturer, we find

	<u>SALES</u>	<u>INCOME</u>
Sales and income were	$3200 \times 13 =$	$\$41600$
	$\underline{1600} \times 24 =$	$\underline{38400}$
	4800	$\$80000$
Costs were $20,000 + 4800 \times 10 = \$68,000$		
Profits were $\$80,00 - \$68,000 = \$12,000$		
Analyzing Team 6, a retailer, we find		
Potential sales were $1/3 \times 3000 + 4000 - 100 \times 35 = 1500$		
Purchases were 1600 meaning surplus was 100.		
Income was	$1500 \times 35 =$	$\$52,500$
	$\underline{100} \times 10$	$\underline{1,000}$
	1600	$\$53,500$
Costs were $5000 + 1600 \times 24 = \$43,400$		
Profit was $\$53,500 - \$43,400 = \$10,100.$		

The game was played in four sections of our freshman course this fall. In each section it was played for two 2-hour periods, with 5 quarters played in the first period and 7 quarters the second period, for a total of 12 quarters in the game. There were two manufacturers and four retailers in each section.

One concern in designing a game with two different type teams is that one type of team might always come in either first or last consistently. We were thus very pleased to find that in this fall's play the two manufacturers came in first and second, first and fourth, fifth and sixth, and fifth and sixth. Thus the manufacturers did both very well and very poorly, depending upon how the game developed and overall had an average ranking of 3.75 compared to the retailers' average ranking of 3.375, about as close to the 3.5 grand average as we could have hoped for. Thus the game did not appear to be unduly biased towards either manufacturers or retailers in actual play.

Another concern in this game was that feeling might run so high that manufacturers and retailers might unite against one another and refuse to deal with one another. However, the fixed cost losses that would result were enough so that this did not happen in any of the forty-eight quarters played, although feelings certainly did run high at times.

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Analysis of the game can actually be quite sophisticated, giving the opportunity for good analysis to be a real asset in the negotiation process. Thus a salesman for a manufacturer could effectively “sell the bottom line” to a retailer if he were capable of doing so. Several opportunities for manufacturers and retailers to make good profits by cooperating exist.

A reasonable equilibrium position in the game would be for each manufacturer to sell 1500 horns at \$20 apiece to each of two retailers who sell them for \$30. At this position, all teams would earn \$10,000 profit each quarter. Actually, the retailers could charge a higher price the first quarter and make more money. They could charge \$35 the first quarter and still sell 1500 horns, giving the retailer a one-shot additional profit of \$7500.

Another way manufacturers could make \$10,000 profit would be to sell each of two retailers 3000 horns at \$15 apiece. Retailers could also make profits of \$10,000 by selling at a price of \$20. However, in this case retailers could improve their profits by selling only 1800 at a price of \$28 and dumping the balance at \$10 for a profit of \$12,400 with more available in the first quarter.

An approximate optimum equilibrium would be for manufacturers to sell each of two retailers 1600 units at \$15 which, when resold at \$28, would yield profits of some \$12,000 for all teams.

In actual play teams did not even approach the optimum profits for all teams, although several teams secured profits much higher than these at the expense of the teams they were dealing with. Most freshman teams perceive the game as a direct conflict between retailers and manufacturers and, during play, fail to realize that appropriate analysis and a cooperative spirit can let all teams earn good profits. Thus we did not observe even one manufacturer essentially franchising two retailers and earning profits for all three teams sufficient to beat out the others.

After the game was over, time was spent in an informal discussion and evaluation of the game. The potential advantages of retailers and manufacturers cooperating were pointed out and the results of one manufacturer trying to get all the business by charging a low price (the other manufacturer just charged a lower price the next quarter) were discussed. The following general points came out.

1. Most students felt the game was very worthwhile and that devoting two periods to it was desirable.

2. They saw that being overly aggressive in negotiating

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could backfire in later quarters.

3. They realized that they tended to lose sight of analysis as learned in other games and became involved almost solely in competing against the teams they were dealing with.

4. Some said that while they thought the game was valuable, they didn't "like" the game because feelings ran too high.

5. All felt they learned a lot about how they and others react in this sort of situation.