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General Overview

You are about to participate in a management decision making game. You and the other participants will be acting as teams of business executives making periodic high-level decisions. These decisions will be similar to those which would be made in actual business practice over a much longer time.

The game is actually a mathematical model of a business economy, within which several firms compete for their share of the market. The decision teams, consisting of three or more individuals are each given a firm to operate. While each firm produces a similar product, they are not perfect substitutes.

The basic problem involved in the exercise is that of choosing a course of action under conditions of uncertainty. The results of any decisions will depend not only on your decisions alone, but also on those made by competitors. Thus, an unwise decision might occur because of a rival firm's action, rather than the unreasonableness of the decision itself. For example, a cut in price will increase your share of the market -- but only if other firms are not cutting prices at the same time.

At the beginning of each quarter, each team makes decisions for their firm choosing output levels, price, advertising expenditures, etc. The computer then simulates the business activity of each firm and prepares reports showing the results during the quarter. These reports, which indicate the firm's financial position, as well as other data, are then transmitted to the teams. They are the only means by which information is exchanged. This cycle is repeated as frequently as time permits or up to 16 quarters, thus allowing several years of simulated business activity and the associated decision-making experience to take place.

How the Game is Played

All that is needed is some experience in business decision making. The peculiarities of the exercise will be easily understood after one or two quarterly cycles. You should approach decision problems posed by the exercise in the same manner in which you approach problems of everyday business life. Choose an objective. Choose a strategy to obtain that objective and be flexible enough to reverse yourself if it appears that you are heading for trouble.

At the beginning of the exercise, each team is presented with a statement which includes the following information:

The balance sheet of all firms.

The income statement of the firm that the team controls.

Market information for the previous quarter, listing the prices charged by all firms, the stock price of each company, total industry sales, actual and potential sales for the firm the team controls, and dividends paid by each company.

An operation worksheet and a decision worksheet showing a summary of funds and alternatives available to the firm for the next quarter.

This information is available to each team at the beginning of each quarter. All teams start with identical data and with identical decision alternatives. Based on this information, each team makes its decisions for the next time period. After analyzing the results of the previous quarter, new decisions are then made by each team. The process continues to the end of the exercise.

The teams have direct control over 7 decision variables.

1. Price
2. Advertising expenditure
3. Research and development expenditures
4. Net investment in plant and equipment
5. Expenditures on market research
6. Production
7. Dividends

There are two restrictions imposed upon the set of available decisions:

The total expenditures of each firm must not exceed the funds available. To the extent that expenditures exceed cash plus depreciation, the firm must borrow on its line of credit.

For each of the decision variables, the firm must choose among the values listed on the quarterly statement of the firm. Dividends, however, may be set at any value.

Within these restrictions, the team may choose any strategy which it feels is desirable.

Economic Relationships:Demand

The game is governed by real world economic rules. Thus the game mirrors the cause and effect relationships which exist in the present economic environment. Among these are total industry demand, the individual firm's market share, and production costs.

Total Industry Demand

Total industry or market demand (potential sales) depends upon a long term growth trend, the phase of the business cycle, the average price per unit charged by the industry, and industry expenditures on research and development and advertising in the current and three preceding quarters.

The effect of these variables on the size of the total industry demand (potential sales) is as follows:

Increased expenditures by the industry on research and development increase the total market.

The major impact of research and development expenditures occurs three to four quarters following a firm's expenditures.

Increased expenditures by the industry on advertising increases the total market, with the major impact of such expenditures occurring in the current quarter and with decreasing impact over the next three quarters.

A lower average price charged by the industry results in an immediate increase in the total market.

Due to population and income growth, total market demand will show a moderate rate of growth over time. In addition to this, however, there are unpredictable changes in demand from period to period over which the firms have no control. Likewise, expenditures for research and development will tend to increase industry demand. However, this depends not only on the level of such expenditures, but also on random elements which reflect the basically unpredictable nature of research.

Individual Firm's Demand

A firm's market share or demand depends on its relative outlays on research and development and advertising in the current and three preceding quarters. It also depends on the price charged in the current quarter by the firm relative to prices charged by other firms.

The individual firm's share of the market increases:

- 1) When the price charged by the firm declines relative to the prices charged by other firms.
- 2) When advertising expenditures by the firm increase relative to the advertising outlays of other firms.
- 3) When research and development outlays of the firm increase

relative to the research and development expenditures of other firms.

As with industry demand, there is a random element in research and development. A small outlay might result in a large increase in market share if the research is successful. Alternatively, a large outlay might result in an actual decline in market share if the research is unsuccessful (e.g., the development of an idea which actually reduces the "attractiveness" of the firm's product). Share of the market also depends upon the ability of the firm to supply its product. If production and available inventories are not sufficient to supply the potential demand for the firm's product, the firm is penalized in succeeding quarters through the loss of customers that the firm was unable to supply.

Economic Relationships: Supply and Cost of Production

The costs of the firm include:

- Production costs
- Advertising costs
- Research and development costs
- Market research costs
- Inventory carrying costs
- Interest costs

With the exception of production costs, expenditures are assigned to the quarter in which they are incurred. Cost of goods sold is determined by using the FIFO method of inventory valuation. Since goods are costed out of inventory on the basis of "**first in, first out**"; production costs incurred in one quarter will usually influence cost of goods sold in succeeding quarters.

The team has direct control over the level of advertising, research and development and market research expenditures. It may set these at any level it chooses, consistent with the prior restrictions. Inventory carrying costs are determined by the number of units the firm has in inventory at the beginning of the period (20 cents per unit of inventory). Interest costs are determined by the level of borrowing and the interest rate (3% per quarter).

The firm's unit costs depend on plant capacity, level of production, variations between quarters and outlays on research and development during the preceding four quarters. The effect of these variables on unit costs is as follows:

There are fixed costs involved in production, so that increasing output tends to decrease unit cost. However, as capacity is neared inefficiencies develop which increase unit costs. The most efficient level of plant utilization is at approximately 95% of capacity. Higher or lower levels of output will result in higher unit costs.

Unit costs decline as the capacity of the firm is increased.

Changes in output levels (either up or down) involve costs and will increase unit costs.

Increased expenditures on research and development lower unit costs. The major impact occurs three to four quarters following the expenditures.

Certain information is freely available to all firms. These include total industry demand, prices charged by all firms in the industry, the stock price, amount of dividends paid and financial position of all companies and the firms's share of the market and demand for its product.

In addition, the firm may buy information through the outlay of market research funds. Items available are competitors' market shares, total industry expenditures on

advertising and relative quality of all products.

Economic Relationships: Credit and Stock Prices

A firm's line of credit is determined by either its prior profits or the market quotation of its stock (whichever is more favorable to the firm).

An increase in the stock price above \$60 will increase the firm's borrowing potential.

An increase in profits will increase a firm's borrowing potential, unless inventories form a more favorable basis for credit purposes. The major impact of increased profits occur on a firm's credit in the first and second quarters following the increases.

Inventories may be regarded as collateral. However, their value as collateral drops if the market is glutted with inventories in relation to industry sales.

The market price of the firm's stock depends upon the firm's profits and dividends paid in the four preceding quarters, the total net assets of the firm, the value of inventories held by the firm, the capacity of the firm and the phase of the business cycle. The effect of these variables on the market price of the firm's stock is as follows:

An increase in profits or dividends increases the stock price, with major impact occurring in the first and second quarters immediately following each increase.

An increase in the net assets of the firm increases the stock price.

An increase in the value of inventories held by the firm decreases the stock price.

An increase in the capacity of the firm increases the stock price.

An improvement in general business conditions increases the stock market quotations.

Making Your Decisions

The decisions chosen by your team should be written on the OPERATIONS WORKSHEET and marked on the DECISION WORKSHEET. Then enter these values into the computer. A special screen has been designed for entering your decisions. This screen can be accessed by starting the Strategic Business Simulator - Decision Entry program.

All columns on the DECISION WORKSHEET (except the three columns relating to production) are independent of one another. Any entry may be chosen, as long as total expenditures for all items do not exceed total funds available. Use the OPERATION WORKSHEET to ensure that this restriction is not violated.

From quarter to quarter, the set of available decision alternatives will change as a result of past decisions of the firm. This is not true of the columns headed "Net Investment" and "Market Research" which will remain the same throughout the exercise.

The production alternatives will change as cash holdings change. Alternative levels for price, advertising expenditures, and research and development outlays for each quarter are printed with previous quarter's decision choice in the middle of the list.

Drastic quarter-to-quarter changes are not allowed. To achieve your objective, you must make long range plans involving gradual increases or decreases in the levels of the decision variables.

Quarterly Report: Balance Sheet and Inventory Analysis

This section will explain, in detail, the data your firm will receive in order to operate. As you study each page make notes of any questions so that you can discuss them prior to the start of the exercise. Each item is described in the sequence it appears on the computer output.

You will receive a balance sheet for your firm each quarter which shows its current financial position.

The figures shown under CHANGE are the changes in your firm's assets and liabilities as a result of operations and decisions made the previous quarter.

BALANCE SHEET

ASSETS

CASH -	the amount on hand
INVENTORY -	units on hand times PRODUCTION UNIT COST previous quarter (FIFO valuation)
GROSS PLANT -	total value of plant and equipment before DEPRECIATION RESERVE
DEPRECIATION RESERVE -	the amount reserved to date
NET PLANT -	GROSS PLANT less DEPRECIATION RESERVE The figure for NET PLANT is equal to the number of units of capacity times \$5.00. One unit of capacity produces one unit of output.

LIABILITIES

LOANS OUTSTANDING -	the amount the firm owes on loans previously contracted.
NET WORTH -	CASH plus INVENTORY plus NET PLANT less LOANS OUTSTANDING

INVENTORY ANALYSIS

BEGINNING INVENTORY -	number of units on hand at the beginning of the prior quarter
UNITS PRODUCED -	total units produced

UNIT SALES -

total units sold

ENDING INVENTORY -

beginning inventory plus units produced less
unit sales

Quarterly Report: Income Statement and Sales Analysis

INCOME STATEMENT

The income statement shows the operating results for the previous quarter.

SALES -	units sales multiplied by PRICE
COST OF GOODS SOLD -	total COST of PRODUCTION (includes Depreciation) adjusted by net dollar change in INVENTORY
ADVERTISING RESEARCH AND DEVELOPMENT MARKET RESEARCH INVENTORY CARRYING COST -	\$0.20 per unit held in inventory at the start of the previous quarter
INTEREST COST -	3% per quarter on loans outstanding

PROFIT

INCOME BEFORE TAXES -	SALES income less TOTAL COSTS
TAXES -	35% of INCOME BEFORE TAXES
PROFIT AFTER TAXES -	INCOME BEFORE TAXES less TAXES
DIVIDENDS PAID	
RETAINED EARNINGS -	PROFIT AFTER TAXES less DIVIDENDS
EARNINGS PER SHARE (QUARTER) -	INCOME AFTER TAXES divided by 100,000 shares outstanding
EARNINGS PER SHARE (ANNUAL) -	sum of the previous four quarters of INCOME AFTER TAXES divided by 100,000 shares outstanding
AVERAGE RETURN ON ASSETS -	RETURN ON ASSETS (ROA) averaged over all quarters played. ROA for a specific quarter is defined as $(\text{INCOME AFTER TAXES} + \text{INTEREST EXPENSE} * (1 - \text{Tax Rate})) / \text{average total assets}$. The tax rate is 35%. Average total assets is computed using the total assets at the beginning and end of the quarter. This figure is multiplied by four to derive an annualized return.

LOAN INFORMATION

BEGINNING BALANCE -	value of loans outstanding at the beginning of the prior quarter
BORROWED/REPAID -	amount borrowed or repaid during the quarter
ENDING BALANCE -	value of loans outstanding at the end of the prior quarter

SALES ANALYSIS

POTENTIAL SALES -	based on product quality, price and
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ACTUAL SALES -
UNMET POTENTIAL -

advertising outlays. The number of units your firm sold or could have sold the previous quarter. Actual sales equal potential sales unless your firm ran out of inventory. You will receive this figure for your firm each quarter. If your firm runs out of inventory, it will be penalized by losing customers for the next four quarters.
actual sales for the quarter
potential sales less actual sales

Quarterly Report:Operations Worksheet-Funds Available

FUNDS AVAILABLE (as of the beginning of the current quarter)

CASH - This is the figure shown for your firm on the BALANCE SHEET.

DEPRECIATION - This figure will be determined and printed by the computer. It represents depreciation expense for this quarter and is equal to 2% of the firm's net plant as shown on the BALANCE SHEET.

TOTAL CASH AVAILABLE - CASH plus DEPRECIATION. Depreciation was included in the COST OF PRODUCTION even though it does not involve a cash outlay. This is balanced by adding the amount of DEPRECIATION to CASH, and calling the resulting sum TOTAL CASH AVAILABLE.

LINE OF CREDIT AVAILABLE - the maximum indebtedness permitted.

LOANS OUTSTANDING - amount outstanding as of this date as shown on quarterly financial position report.

BALANCE - equals LINE OF CREDIT AVAILABLE less LOANS OUTSTANDING. If positive, it is the maximum amount by which loans may be increased. If negative, it is the minimum amount by which loans outstanding must be decreased.

LOAN REQUEST/REPAYMENT - amount you wish to borrow or repay this quarter

TOTAL FUNDS AVAILABLE - the sum of CASH AVAILABLE and the LINE OF CREDIT BALANCE. This figure represents the maximum expenditures possible this period.

Quarterly Report: Operations Worksheet - Expenditures

EXPENDITURES (for the current quarter)

COST OF PRODUCTION -

This figure is the sum of estimated production costs and depreciation.

INVENTORY CARRYING COST -

This figure is equal to \$0.20 per unit held in inventory at the beginning of this period.

NET INVESTMENT

MARKET RESEARCH

ADVERTISING

RESEARCH AND DEVELOPMENT

DIVIDENDS PAYMENT

ESTIMATED INTEREST COST -

This figure is estimated by each company, at an interest rate of 3% per quarter.

TOTAL EXPENDITURES -

includes DEPRECIATION which is not a cash outlay but is included in COST OF PRODUCTION.

For any firm the TOTAL EXPENDITURES may exceed CASH AVAILABLE only by the amount that LINE OF CREDIT AVAILABLE exceeds LOAN OUTSTANDING. Therefore, if the figure printed for BALANCE under LINE OF CREDIT is positive compare proposed TOTAL EXPENDITURES with CASH AVAILABLE:

- a. If the proposed TOTAL EXPENDITURES is smaller than CASH AVAILABLE you may pay back on LOANS OUTSTANDING up to this difference.
- b. If the proposed TOTAL EXPENDITURES is greater than CASH AVAILABLE you may either borrow to cover this deficit up to the amount shown under AVAILABLE FOR LOAN INCREASE or reduce the amount AVAILABLE FOR LOAN INCREASE does not cover the difference, then you must reduce the proposed TOTAL EXPENDITURES until it will.

Alternatively, if the printed figure for BALANCE under LINE OF CREDIT AVAILABLE is negative you must pay back at least this amount and indicate this under LOAN REQUEST/REPAYMENT. (The amount being repaid plus TOTAL EXPENDITURES must not exceed the CASH AVAILABLE.) When entering this decision use a plus number (\$0,000) to indicate a loan request and a negative number (-\$0,000) for loan repayment.

Quarterly Report:Decision Worksheet

You must choose one alternative in every column and also enter the figures for DIVIDENDS and INCREASE or DECREASE IN LOANS. Each of these values must be entered correctly in the "Quarterly Decision File".

- PRICE -** The selling price for each unit. For each quarter the range of alternatives will be plus or minus \$0.30 in \$0.05 increments around your firm's decision choice the previous quarter.
- NUMBER OF UNITS -** your range of alternatives depends upon the cash position of your firm at the beginning of the quarter. The columns labeled PRODUCTION COST and UNIT COST are for information purposes only.
- ADVERTISING -** for each quarter the range of alternatives will be \$60,000 in \$10,000 increments around your firm's choice the previous quarter.
- RESEARCH & DEVELOPMENT -** for each quarter the range of alternatives will be \$30,000 in \$5,000 increments around your firm's choice the previous quarter.
- NET INVESTMENT -** the alternatives will be the same each quarter. Each unit of capacity costs \$5.00. For example, the middle figure of \$120,000 represents 24,000 units of plant capacity. This figure represents gross investment. Because your plant is depreciating it takes at least \$100,000 each quarter to avoid reduction in capacity. Thus, a \$0 expenditure on NET INVESTMENT causes a reduction in capacity due to depreciation. It is also possible to sell physical assets. However, a decision to sell plant also causes capacity to fall and reduces assets. To sell plant and equipment, enter a negative amount for investment.
- MARKET RESEARCH -** your firm may purchase certain market information in any combination. If you prefer not to buy any market research information, enter \$0.

Quarterly Report:Market Information

SELLING PRICE -price charged by each firm the previous quarter.

ADVERTISING EXPENDITURES - If your firm purchases MARKET RESEARCH data code "M" then the dollar amount of advertising spent by each firm in the previous quarter will be printed.

PRODUCT QUALITY - If your firm purchases MARKET RESEARCH data code "Q" you will receive the relative product quality for each firm on a scale of 1, 2 or 3. "1" is the highest and "3" the lowest. Product quality reflects the effectiveness of each firm's research and development outlays.

MARKET SHARE - If your firm purchases MARKET RESEARCH data code "S", then the market share for each firm will be printed.

MARKET SALES (in units) - The aggregate sales in units of all firms in the industry for the previous quarter. This is free and always printed.

INDUSTRY ADVERTISING- The aggregate dollar amount spent by all firms during the previous quarter. This is free and always printed.

Quarterly Report:Quarterly Statements

The quarterly statement for each firm is published at the end of each quarter and made available to the other firms in the exercise. In addition to summarizing the balance sheet position of each firm, the annual statement also shows profits earned over the previous quarter.

NET ASSETS -	value of GROSS PLANT less DEPRECIATION.
PROFIT AFTER TAXES-	earned in previous quarter.
STOCK PRICE -	current quotation of each firm's stock price on a stock exchange. There are 100,000 shares of stock for each firm.
DIVIDENDS-	paid in previous quarter.
CASH-	currently available.
INVENTORY-	number of units currently available to sell.
INVESTMENT -	investments made in plant and equipment in the previous quarter.
OUTSTANDING LOANS -	the amount the firm owes on loans previously contracted.

Explanation of the Company Ranking Report

The Company Ranking Report is used to determine which company is winning the game based on the following criteria: Earnings Per Share (Annual), Average Return on Assets, and Stock Price. The rankings of the above criteria are summed and the team with the lowest total points is considered to be in first place.

EARNINGS PER SHARE (ANNUAL)-

The amount of a company's earnings for the previous four quarters for each share of common stock held by the stockholders. This stockholder profitability ratio indicates how effective a company has been in meeting the profit objectives of its owners.

AVERAGE RETURN ON ASSETS-

The amount of net income earned in relation to total assets. This figure is an annualized average of all quarters. This company profitability ratio is an indicator of a company's efficiency in the use of its economic resources.

STOCK PRICE-

The market value of a company's stock.

TOTAL POINTS-

This is the sum of the earnings per share ranking, average return on assets ranking, and stock price ranking. The company with the lowest total points is considered to be in first place.