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THE INVESTMENT DECISION GAME: AN EXPERIENTIAL LEARNING APPROACH TO STOCK MARKET DECISIONS THROUGH GAMING

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ABSTRACT

The generation of capital through the public market system is a unit of study in most introductory business, management, arid finance courses. In addition, the use of computers in these introductory courses has increased in recent years. 'The Investment Decision Game" is a computer-assisted learning approach to the stock market decision. A description of the game follows an introduction which presents reasons for developing the game.

INTRODUCTION

Business academicians have recognized the need to simulate diversified and complex business problems in the classroom in order to present the student realistic decision making situations. Because the stock market is an integral part of a number of business courses and because many business students, especially those in finance, accounting, and economics. have strong interests in stock market decisions, the author developed a computer game as a useful classroom tool in studying the investment decision making process.

To be a learning experience and a challenge to the student, such a game would require. the following characteristics.

1. Involve the student in the investment decision making process
   - --savings vs. stock investment decisions
   - --portfolio decisions
   - --buy and sell decisions
2. Expose the student to income statement information for companies to facilitate discussion of various theoretical approaches to stock investment
3. Allow the student to interact with the computer as if it was a broker
4. Easy to use for student and instructor It was with these criteria in mind that "The Investment Decision Game" was developed.

FEATURES OF THE COMPUTER GAME

Each student is 'given' $250,000 to invest in either certificates of deposit earning 7 percent interest, stock, or some combination of the two. The object of the game is to parlay the $250,000 into a higher return on investment than the return from investing all the money in certificates of deposit at *7* percent.

The computer acts as a broker and provides information on 100 companies in 15 industries. After the student has made the initial investment decision, the computer-broker can provide the student with the following information.

1. A summary report of the most recent transactions made by the student. indicating name of company and industry, number of shares purchased, purchase price, and total cost (including broker's fee)
2. summary report of the students portfolio containing:

--list of stocks owned, purchase price for each

- --dividends received for quarter
- --interest received for quarter
- --total holdings in cash and securities
- --current value of portfolio

3. A rank in the class for the student based on portfolio value
4. Index for current quarter
5. Projected index for next quarter
6. Financial information on any or all of the 100 companies

Both an interactive and a batch process game has been developed. An instructor can also choose between two forms of the game -- a long (students play game for 12 weeks) and a short (4 weeks, especially suited for summer sessions). One week represents one quarter. Therefore, a student can have the experience of market investment for 3 years if the long form is used, for year if the short form is used. The student has an option each time he uses the game to utilize a shortened form which speeds the inputing of buy/sell decisions by reducing prompting.

The student also has the option of buying or selling at a specific price per share, which the student sets, or at the market price.

The "Investment Game' is written in FORTRAN. The interactive mode is especially useful because the student has the capability of interacting with the computer program and receiving instant feedback. The hands- on environment introduces the student to the computational power and efficiency afforded by the computer. Direct benefits of this approach are proficiency in the use of a conversational computer system, and the true understanding of timely information.

THE INVESTMENT GAME COMPUTER PROGRAM

"The Investment Decision Game" consists of the following components:

1. Program card deck
2. Student manual
3. Instructor manual

Program Card Deck

Historical data in the form of variations of stock values for 100 companies in 15 industries are in the master file. In addition, 12 quarters of stock values for each of the 7 variations is available. Eighteen data items for each stock are made available to each student to aid him in the purchase decision. The fifteen industries and the number of companies in each industry that are available on the master file are presented in Appendix I. An example of the eighteen data items for four companies in the Gold Mining industry is presented in Appendix II.

The master file is able to handle puts and calls and output to students containing these items:

1. stock purchased
2. number of shares purchased
3. amount of purchase
4. commission charges
5. current price of stock
6. net change in price of stock since purchase
7. accumulated dividends
8. interest on $250,000 of certificates of deposit

Student Manual and Instructor's Manual

In addition to output examples and a complete printout of the game, these manuals contain information regarding the intricacies of the stock market and concepts the student will need in order to make buy and sell decisions. The purpose of the manuals is to not only acquaint the reader with the game and playing rules, but to assure that debriefing takes place. The student is requested to reflect and analyze the decision processes which took place, and the instructor is given ideas on how to enhance the learning.

The Instructor's Manual also acquaints the instructor with the various forms of the game and suggestions on creative uses. Directions are given on how to advance the game to the next quarter and process the students' transactions.

APPENDIX I

OPTION NUMBER	TYPE OF INDUSTRY	NUMBER OF COMPANIES
0	BEGIN LISTING	
1	GOLD MINING	6
2	COAL MINING	2
3	BREWERS	7
4	DISTILLERS	4
5	OIL	17
6	BUILDERS	3
7	STEEL	8
8	OFFICE EQUIPMENT	6
9	COMPUTER EQUIPMENT	5
10	AUTOMOTIVE	3
11	RAILROADS	4
12	AIRLINES	9
13	TELEPHONE	7
14	NATURAL GAS	1
15	EATERIES	5
16	BANKS	8
17	CONGLOMERATES	5
18	ALL	100

CONCLUSIONS

"The Investment Decision Game" is a computerized stock market game that has been developed with the criteria of classroom usefulness, challenge, and ease of use. The game is easy for an instructor to administer.

After each student in a class has completed his transaction for the week, the instructor simply sends the class number to the computer-broker via card or terminal and the stocks are advanced by the program one quarter. As a result of this process, the instructor receives output on the rank of each students portfolio. The instructor can also delete a student's name by relaying his name and code number through the computer. A one word input also erases all classes at the end of a semester.

The game is easy for a student to use because it is highly prompted for naive users. A short-form option is available for the experienced user. Portfolio security is guaranteed through the assignment by the computer of a code number to each student. Only the correct combination of name and code number will allow a student to make transactions.

"The Investment Decision Game' is a basic building block for several possible growth applications and as such is designed to provide the student with a learning unit which can be mastered without engendering the aversion which a complex may have on the student. For instance, such concepts as the investment-opportunities approach, the stream-of-dividends approach, and the discounted-cash-flow approach could be addressed in modified versions of the program. Further, the de- termination of the utilities of the payoffs associated with alternative investment decisions. Such expansions or the game would make it usable in a more advanced finance course and thereby broaden the game's application and usage among business students.

APPENDIX II

* GOLD MINING	CAMPBELL RED LAKE MINES		1001*
NET SALES	2383000.00	DEPRECIATION +AMORT	38000.00
INCOME TAXES	376000.00	NET INCOME	993000.00
AVAIL FOR COMMON	993000.00	MARKET PRICE	26.03
DIVIDENDS PER SHARE	.15	SHARES TRADED	126375.00
E P S EXCL EXTRA	.25	OPER INCOME -DEPR	1285000.00
FIXED CHARGES	0.00	PRETAX INCOME	1369000.00
PERFERRED DIVIDENDS	0.00	AVAIL COMMON BF ADJU	993000.00
EXTRAORDINARY ITEMS	0.00	P / E RATIO AS A PCT	.79
STOCK PRICE LOW	25.05	STOCK PRICE HIGH	26.03

* GOLD MINING	DOME MINES LTD		1002*
NET SALES	5380000.00	DEPRECIATION +AMORT	85000.00
INCOME TAXES	865000.00	NET INCOME	1618000.00
AVAIL FOR COMMON	1618000.00	MARKET PRICE	51.45
DIVIDENDS PER SHARE	.27	SHARES TRADED	102000.00
E P S EXCL EXTRA	.83	OPER INCOME - DEPR	1987000.00
FIXED CHARGES	0.00	PRETAX INCOME	2947000.00
PREFERRED DIVIDENDS	0.00	AVAIL COMMON BF ADJU	1618000.00
EXTRAORDINARY ITEMS	-137000.00	P / E RATIO AS A PCT	.47
STOCK PRICE LOW	46.50	STOCK PRICE HIGH	51.45

* GOLD MINING	GIANT YELLOWKNIFE MINES		1003*
NET SALES	2176000.00	DEPRECIATION +AMORT	105000.00
INCOME TAXES	43000.00	NET INCOME	166000.00
AVAIL FOR COMMON	166000.00	MARKET PRICE	5.32
DIVIDENDS PER SHARE	.07	SHARES TRADED	155550.00
E P S EXCL EXTRA	.04	OPER INCOME - DEPR	338000.00
FIXED CHARGES	0.00	PRETAX INCOME	277000.00
PREFERRED DIVIDENDS	0.00	AVAIL COMMON BF ADJU	166000.00
EXTRAORDINARY ITEMS	0.00	P / E RATIO AS A PCT	1.07
STOCK PRICE LOW	5.32	STOCK PRICE/HIGH	5.70

* GOLD MINING	HOLLINGER MINES LTD-CL A		1004*
NET SALES	2820000.00	DEPRECIATION +AMORT	26000.00
INCOME TAXES	925000.00	NET INCOME	2320000.00
AVAIL FOR COMMON	2320000.00	MARKET PRICE	31.20
DIVIDENDS PER SHARE	.27	SHARES TRADED	4500.00
E P S EXCL EXTRA	.47	OPER INCOME - DEPR	2176000.00
FIXED CHARGES	0.00	PRETAX INCOME	4099000.00
PREFERRED DIVIDENDS	0.00	AVAIL COMMON BF ADJU	2320000.00
EXTRAORDINARY ITEMS	0.00	P / E RATIO AS A PCT	.50
STOCK PRICE LOW	30.00	STOCK PRICE/HIGH	31.20

Net Sales - gross sales and other operating revenue less discounts, returns and allowances.

Income Taxes - federal, state, other and deferred income taxes.

Avail for Common - Available for common after adjustments for common stock equivalents' represents net income less preferred dividend requirements.

Dividends Per Share - the cash dividends per share during the reporting period.

E P S Excl Extra - Earnings per share - excluding extraordinary items' represents the primary earnings per share applicable to the last twelve month period.

Fixed Charges - all interest expenses, the amortization of debt discount or premium and the amortization of expenses (i.e. underwriting, brokerage fees, advertising costs, etc.). It includes debenture expense and discount on receivables sold.

Preferred Dividends - the preferred dividend requirement on the preferred stocks of the company during the period.

Extraordinary Items - those items stated by company in its profits and loss statement as net taxes. Extraordinary expense is a positive number, extraordinary income is negative. such items as flood losses, profit or loss on sale of assets, investments, securities, etc. are included.

Stock Price Low - the lowest price the stock sold for in the preceding quarter.

Depreciation Amort - non-cash charges for obsolescence and wear and tear on property, allocation or the current portion of capitalized expenditures, and depletion charges.

Net Income - income after all operating and non- operating income and expense, but before preferred and common dividends.

Stock Price Close - price of stock at the close of the quarter.

Shares Traded - number of common shares traded during the last calendar year.

Oper Income - Depr - 'Operating Income before Depreciation represents net sales less cost of sales and operating expenses (i.e. cost of goods sold) before deducting depreciation, amortization and depletion.

Pretax Income - operating and non-operating income.

Avail Common Bf Adju –'Available for common before adjustments for common stock equivalents' represents net income less preferred dividend requirements.

PIE Ratio as a Pct - the closing prcie of the stock is of the earnings per share.

Stock Price High - the highest price the stock sold for in the preceding quarter.