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PLAYER PERFORMANCE UNDER DIFFERING PLAYER CONFIGURATIONS IN *THE INVESTMENT GAME*: SOME PRELIMINARY OBSERVATIONS

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It appears to be quite generally accepted that when using simulations or games in the classroom, the decision making units should be comprised of teams of students. Gamesters are not necessarily in agreement, however, as to the optimum size of teams; in fact, team size may vary according to the nature of the game, the size of the class, the complexity of the decisions, and other factors. This being the case, consideration should also be given to the use of one-person decision units; it is possible that under certain conditions, the optimum size might be one person rather than team decision making units.

The present study is based on some preliminary indications of player performance under different player configurations in *The Investment Game: Selection and Management*. [ii] Although the observations are as yet preliminary, should any conclusions emerge, they may have implications for gaming in general.

The specific question to be answered in this study is whether there is a difference of any significance in the performance of team players as compared with individual players? At this stage of the research the only basis for measurement is portfolio performance; this is used as the criterion for the comparison. If team performance is better than individual performance, this should give some clue as to the value of the committee concept in decision making. Conversely, if individuals outperform teams, the trade-off in performance may be the result of the compromises necessary in team decisions.

THE GAME

The Investment Game is different from most of the simulations that have been developed for use in college level business administration courses. A few of the features of the game, therefore, are described briefly.

One area, perhaps more than any other, in which real world “players” cannot interact with each other and in which they

have no influence over the ultimate outcome of their decisions is the area of securities investment. As a result, *The Investment Game* is developed from the perspective of the small investor who cannot influence price and who is, therefore, at the mercy of the market.

In playing the game, selections can be made from 20 industrial common stocks, four corporate bonds, one treasury bill,

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and one certificate of deposit. In addition to market orders, players can attempt to improve or protect their positions through the use of limit and stop-loss orders. Also, the use of margin is permitted.

Numerous economic, market, and industry data are included, as well as condensed economic and market forecasts. For each company, key balance sheet and income statement items, as well as monthly market price data, are included. As a result, players can test many of the commonly used valuation methods in arriving at their decisions to buy or sell stocks.

Four short cases are included so that the players can select the specific type of situation that they want to manage. Decisions can be submitted either annually or semiannually for the ten years included in the game.

In a previous study, the goal of which was to evaluate the game as a learning experience for the players, two specific conclusions were drawn: First, the average annual rate of return for 102 players of the game was significantly lower than the rate of return on the Standard and Poor's 425 stock index and the rates of return on six unmanaged portfolios made up of the game companies. Second, it was found that in those portfolios in which higher returns coupled with greater risk were the objectives, the players were partially successful in that they outperformed the other portfolios. But, they did not outperform the Standard and Poor's 425. [21 Hence, it is believed that the game is a useful exercise for students in the risks and uncertainties of common stock investment.

PERFORMANCE MEASURE

The performance measure utilized in this study is that of compounded annual rate of return. This is a "total return concept" in that it includes market value of holdings, dividends and/or interest received, less acquisition costs (commissions). All comparisons are tested for significance using a one-tailed t-test at the .05 level of significance.

DIFFERING PLAYER CONFIGURATIONS

Background

The underlying objective of the players in many business games is to maximize profit. There may be several intermediate steps, but this is usually the ultimate goal. In striving to attain that goal, most games contain a number of variables which, if dealt with in certain logical sequences, will result in some level of profitability. Players can try various strategies and, when they find those that work best within the parameters of the game, they are then in the position of trying to maximize profits. In this type of game environment, the members of a team

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are seeking a common goal and the methods by which they attempt to attain that goal become the items of discussion, compromise, and ultimate decision making.

In *The Investment Game*, although the portfolio management goals may have been agreed to by the team members, there is a greater likelihood that each person's *perception* of risk, rewards, etc. will influence his decisions. In other words, two persons could be striving for the same goal, but the risk which each perceives in certain strategies could differ widely. This difference in risk perception is relatively difficult to deal with. It is not the type of thing that can be clearly enunciated by the players. Nor can it be clearly defined or quantified in developing investment strategies. Perhaps it is for these reasons that conflicts have arisen among the members of the teams that have played *The Investment Game*.

The players in *The Investment Game* are performing the activities of portfolio managers. Therefore, the use of teams can easily be defended as simulating the use of investment committees in trust departments and other portfolio managing institutions. Based on philosophical and behavioral differences, however, it is probable that major disagreements develop in many committees and that the ultimate decisions reflect a significant amount of compromise among the members. Hence, although the noninteractive nature of *The Investment Game* may make it different from many business games, the question of individual decision makers rather than teams is not only relevant to this game but should be worthy of consideration in other gaming situations.

Following the original development of *The Investment Game*, it was assumed that the appropriate decision-making units were teams. It was also decided, with the agreement of the classes, that two-persons constituted the practical team size. As a result, the students were instructed to find a person with whom they thought they could agree philosophically and form a team. This method was used the first three times the game was played.

During the course of these first three semesters, complaints became more and more numerous that it was too difficult to reach agreement on investment decisions. The general complaint was that although at the outset the two persons thought that their investment philosophies were sufficiently alike to permit a reasonable degree of cooperation, as the game progressed the disagreements became more severe.

Following these experiences, it was decided that the game should be played by individual players. The only constraint placed on the students was that the majority would rule; if the majority chose to "go it alone," that decision would be binding on all students.

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With this background, the primary area of concern becomes one of whether the disagreements which have existed among the team members playing *The Investment Game* are of sufficient importance to justify the playing of the game only by individuals. In an attempt to arrive at a quantitative indication of this, the question to be examined is whether there has been any difference of significance in the performance of teams as compared to individual players?

Table 1 shows the performance of 102 players of *The Investment Game* according to whether the decisions were rendered by individuals or by two-person teams.

Table 1

PERFORMANCE BY PLAYER CONFIGURATION

<u>Method</u>	<u>No. of players</u>	<u>Mean rate per annum</u>
Teams	39*	7.43%
Individuals	63	6.60%

t value = 1.26--not significant at the .05 level.

* 39 teams of two persons each, for a total of 78 persons.

Based on the data shown, although the teams outperformed the individuals in absolute amount, the lack of significance to the difference indicates that the difference probably occurred due to chance. Since there is no significance to the difference, the question of whether the game should be played by individuals or teams will have to be found by methods other than rate of return. Hence, the following questions are suggested for additional study:

1. Is the need for compromise in a team environment of particular value to the players in preparing them for the "real world" situations which they will face following graduation?
2. Do the individual players gain a greater degree of self-confidence which may be of value to them when placed in positions of responsibility later in life?
3. Does the use of teams simply reinforce the ability to "pass the buck" by not having to be responsible for one's own decisions?

These and other questions deserve much additional study. To the degree that conclusions can ultimately be reached regarding those who have played *The Investment Game*, it is entirely possible that such conclusions may be of value to those playing

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other types of games, particularly those that have “always been played” by teams.

REFERENCES

1. Nielsen, Carl C., *The Investment Game: Selection and Management*, (Belmont, California: Wadsworth Publishing Co., 1974).
2. Nielsen, Carl C., “An Evaluation of *The Investment Game* as Reflected in Player Performance,” *Proceedings*, 13th Annual Symposium of the National Gaming Council, 1975, 483-487.