DELPHI IN THE CLASSROOM: A DEMONSTRATION
OF FORECASTING ECONOMIC ACTIVITY

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A key aspect of the typical business game played in Business Administration courses is the economic forecast which provides the basis for making strategic marketing, production, and financial decisions. One game which has been widely used in such cases is The Executive Game developed by Henshaw and Jackson. In an attempt to enhance the effectiveness of instruction with The Executive Game, a demonstration was conducted with selected student teams who used the Delphi technique to develop economic forecasts. Other teams used traditional trend extrapolation methods to forecast economic activity.

The Delphi technique is a group discussion process which avoids the problems of face-to-face confrontation of group members. Opinions are polled in a series of "rounds" and fed back to participants along with comments made by respondents. After several rounds, a "consensus" is ordinarily reached by participants. The Delphi technique has been widely used with expert participants to estimate future trends. In this case, the Delphi method was used to estimate likely economic conditions in terms of the economic index of business activity.

Methodology Used in the Demonstration

A class of undergraduate students in Administrative Theory and Practice was selected to demonstrate the results possible with the use of the Delphi method. Nine teams in the class were playing The Executive Game. Four of these teams were selected to participate in the Delphi exercise and four other teams were given instruction in the use of a simple, straight-line regression technique for estimating trends. Group nine in the selected class and three groups from another class which was also playing The Executive Game were used as "experts" for the Delphi respondents.

The game decisions covered eight periods of play. During period two, a general orientation was given to the first four groups on the use of the Delphi technique and to the second four groups on the use of a computer oriented regression program. In period three, the Delphi respondents completed the first round of their economic estimation process. Specifically, they were asked to predict during which period in periods 5-8, the economic index would be the highest. The trend extrapolation groups developed an estimation formula from available data during period three. In period four, a second Delphi round was completed and the trend extrapolation groups developed another estimate. Periods 5-8 were used as test periods and no

further instruction was given to any of the groups during this period. Results of the Demonstration Exercise

The ratio of net income/sales was selected as a representative indicator of performance of the teams participating in the exercise. This ratio is affected by pricing, promotion, production, and financial decisions made by each team as well as by the index of economic activity. It provides rough measure of managerial effectiveness in the use of available resources (including information) and cost control. Figure 1 shows the average income/sales ratios from the two groups during the period of play.

The Delphi groups had a higher income/sales ratio than the trend extrapolation groups during the first four periods. However, during the last four periods, the net income/sales ratios were not significantly different for the two groups. In only one period was the income/sales ratio higher for the Delphi groups than for the trend extrapolation groups. The actual economic indexes were 104, 100, 95 and 99 for the preliminary periods and 103, 107, 112, and 112 for the test periods, and average company sales were actually higher for Delphi groups during all eight periods.

It is interesting to observe that the trend extrapolation groups achieved somewhat higher income/sales ratios despite lower sales in the last four periods. These results could be partially explained by a tendency for the Delphi groups to concentrate more time and attention on the forecast of economic activity and a tendency for the trend extrapolation groups to place slightly more emphasis on net income. Another factor which probably had some effect was the fact that the economic index declined in periods 1-4 but increased markedly in periods 5-8. The trend extrapolation groups demonstrated a greater ability to exploit the profit potential of an upturn in the business cycle than the Delphi groups.

Another possible explanation for the convergence of the re- suits of the two groups is the likelihood that the groups using the linear regression technique had a longer learning curve to achieve facility in the use of the technique than did the Delphi group. No doubt both groups benefited in the last four periods from increased experience with the game situation. Continuation of the experiment for a longer period would shed further light on any significant performance differences.

Summary and Conclusions

Even a simple game situation such as this one, the results appear to be caused by the complex interaction of a number of factors. Group decisions on sales prices, sales promotion levels, research and development expenditures, production levels, and other factors as well as

FIGURE 1
INCOME/SALES RESULTS FROM BUSINESS GAME
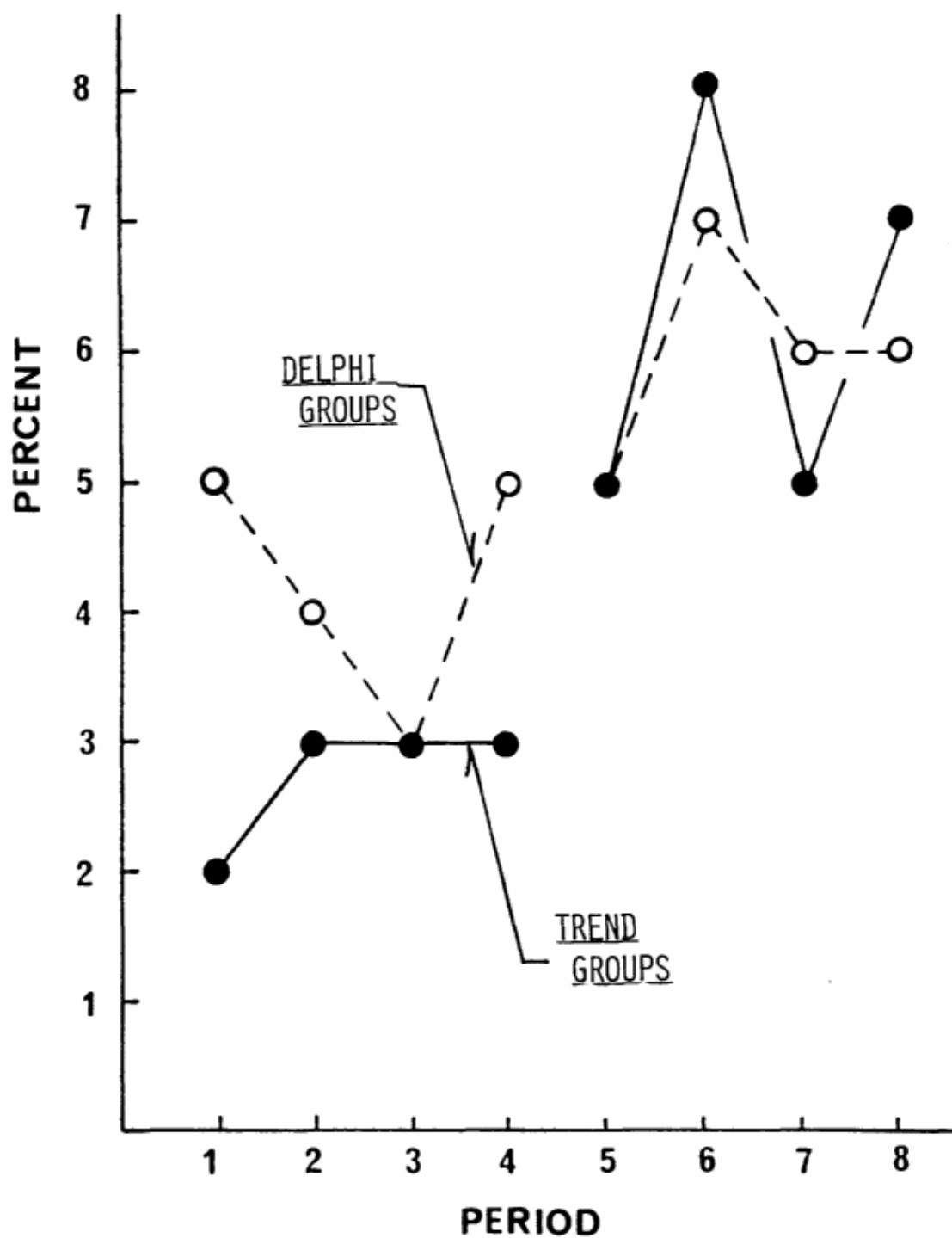
forecasting skills help to determine the results. In addition, with the passage of time, as team members gain experience with the game operation, results can be expected to improve in accordance with the learning curve phenomenon. In spite of this, the importance of forecasting economic activity several periods in advance to long-run results in business games has been well recognized.

The forecasts of the Delphi groups followed the actual economic index more closely during the demonstration period than the economic forecasts of the trend extrapolation groups. On the other hand, the trend extrapolation groups showed greater improvement in net income/sales ratios. One factor which possibly influenced the results achieved is that the trend extrapolation groups learned in period three a technique they could immediately begin to practice, while the Delphi groups obtained outside information only for periods 5-8. A tentative conclusion is that the Delphi technique can, in many cases, contribute to more accurate forecasts of economic activity than more conventional forecasting methods but that Delphi-developed forecasts do not necessarily ensure higher levels of profitability.

The small sample size, the limited scope of the experiment, and the presence of a number of complex, interacting factors prevent any clear conclusions to be drawn as tc the statistical difference in effectiveness. The inclusion of more teams, lengthening of the time period covered by the study, and more careful consideration and isolation of the effect variables other than forecasting techniques on team results are needed if definite results are to be achieved. Nevertheless, the present demonstration may provide an outline and ideas for further experimentation and development with these techniques in the environment of business simulation.

REFERENCES

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