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Using Experiments to Understand Oligopoly Behavior

It often is difficult to find data that allow one to test theory in its purest form. Therefore, social scientists often use experimental methods to test their theories. In the case of economics, using the laboratory as a place to test and develop theory is relatively new. The first experiments were run by E. Chamberlain in 1948. The next attempt at running economic experiments came in 1963 and was conducted by Fouraker and Siegel. Since 1960, several economists have taken up the tool of experimental economics to help determine how different environments and informational situations affect behavior. Many experiments have been used to specifically address the different forms of oligopoly theories.

In experiments, subjects (usually students) are recruited to participate as economic agents. As such, they are participants in a decision-making process in which their decisions and the decisions of other people in the experiment determine the outcome of some market process. To induce the students to take the experiment seriously and to motivate behavior, their decisions are tied directly to monetary rewards. Each student is given a set of instructions for the market in which he or she is participating. In these instructions, students are told how their decisions map into monetary rewards. However, they are not instructed on *how* to act in the market. Any money a participant earns is paid in cash to the student at the end of the experiment.

The results of oligopoly experiments are decidedly mixed. Several experiments have allowed participants to take the role of producer in the same market. The number of participants in the market makes a big difference in the results of these experiments.

When the number of participants in an experiment is two, collusion often results. Fouraker and Siegel, Dolbear et al., Holt, Phillips, Battalio, and Holcomb, and Beil have all found generally the same results in two-person quantity-setting experiments. Approximately 60 percent of the duopoly pairs are able to find and maintain a collusive action with nothing other than their output decisions to guide them. About 25 percent of the participants have market outcomes that are not statistically different from Cournot output levels. However, the Cournot result does not tend to be stable in the sense that participants produce the Cournot output level every time. Instead, output fluctuates around the Cournot level of output. It appears participants would like to move toward collusive outcomes but are unable to accomplish this. The remaining 15 percent of the participants are split equally between output levels that lie between Cournot and collusive and between Cournot and perfectly competitive solutions. When the number of participants in these experiments rises to three or more in each market, Cournot levels of output are almost always observed.

Sources: E. H. Chamberlain, "An Experimental Imperfect Market," *Journal of Political Economy* 56 (1948), pp. 95–108; L. E. Fouraker and S. Siegel, *Bargaining Behavior* (New York: McGraw-Hill, 1963); F. T. Dolbear, L. B. Lave, G. Bowman, A. Lieberman, E. Prescott, F. Rueter, and A. Sherman, "Collusion in Oligopoly: An Experiment on the Effect of Numbers and Information," *Quarterly Journal of Economics* 82 (May 1968), pp. 506–15; C. A. Holt, "An Experimental Test of the Consistent Conjectures Hypothesis," *American Economic Review* 76 (June 1985), pp. 314–25; G. W. Harrison and M. McKee, "Monopoly Behavior, Decentralized Regulation, and Contestable Markets: An Experimental Evaluation," *Rand Journal of Economics* 16 (Spring 1985), pp. 51–69; O. R. Phillips, R. C. Battalio, and J. H. Holcomb, "Duopoly Behavior with Market History," manuscript, University of Wyoming, 1990; R. O. Beil, "Collusive Behavior in Experimental Oligopoly Markets," Ph.D. dissertation, Texas A&M University, 1988.