PROJECT

BARGAINING, CONTRACTS AND STRATEGIC INVESTMENT

The required project for this course will add to your experience gained from 45-974 in designing and analyzing the results of your own experiments. As before, you may do the project by yourself, pairs or in groups of three (in which case all students will be awarded the same grade), but no more than three in a group is permitted.

It is organized around designing, running, and reporting on one or two bargaining and/or contracting games. Parts A and D together essentially consist of a short paper. Part A should motivate the experiments with a model, explain the most important features of the model and, if possible, its solution. Part D should describe how the experiments were conducted, and compare the experimental outcomes with your theoretical predictions.

You will be graded on the nature of the issues (such as whether the questions you pose are interesting to business people, and why your experiments might shed light on them), as well as the analysis itself. The project has four equally weighted parts. Part A of this project is due Tuesday, February 28 and worth one third of the points. Parts B and C will be conducted in class at that time, and together are also worth one third. Part D is Tuesday March 7. Parts A and D are reports of your analysis. The points in Part B are allocated to how well your group runs your own experiment. (Typically students score full marks on this, so I will only subtract marks from part C if things are done really badly.) Part C is based on how well you perform as an individual subject in experiments designed by the others.

Part A

Design one or two related games on bargaining and/or contracting. In the description of each game clearly specify the parameters of your problem, and explain why they are related. There should be some common features between the experiments so that you can attempt to show what happens as you change the parameters that describe your environment. For example, how are the results of a bargaining game affected by whether the players are differentially informed or not, the number of bargaining rounds, whether the bargaining parties have other options to deal with other players instead, and so on? In a contracting game you might focus on how the contract changes with the introduction of a monitor to help measure a player's suitability for a role the contractor is seeking to fill. You are not expected to analyze all the possibilities, but I would like you to focus on some questions that are of interest to you, explaining why they are interesting questions to address. If you cannot solve the game you have designed (because it is too complicated for example) I would like you to conduct your own experiments within your group before conducting the class experiments so that you can predict how subjects will behave. The results of your "informed studied" experimentation should then be compared with what the class actually does.

Part B

Run the games and send the teaching assistants and myself the output files from your experiments. I appeal to you not to use wireless servers: the responsibility is yours if your server does not handle the traffic and you are not wired. Students who do a poor job of running their own experiments will also be penalized up to 50 percent of this portion of the project because it may compromise their results. I urge you to conduct some trials with your study partners and thoroughly familiarize yourself with the process of running experiments and saving the results. Please make a brief oral presentation (maximum 2 minutes) to the class that motivates your games. You should treat the class as future business colleagues who have not taken this course.

Part C

Participate as a player in the other experiments. During the session you may use a proxy name rather than your real one to hide your true identity. If you did not use your real name, please send me email at the end of the session divulging your proxy name. Your grade in this portion of the project will be a strictly monotone increasing function of how well you play the games designed and run by the other students (where you are one of their subjects).

Part D

Write a report on your findings. Please send me a consolidated copy of your report (including Part A as well), and also an attached file of the output from your experiments. The second part of the report should include two sections.

1. Your report will provide the basis for determining how the other students performed on your project for the purposes of grading Part B. Make an Excel table showing how each experimental subject performed in each auction. There should be a row for each player. There should be a column to indicate which player type was assigned to each subject, a column recording the valuation assigned to them, their final bid, and how their final bid was ranked. If a known solution to the game exists, then a subject's actual strategy should be compared with his or her optimal strategy. If your game has a known solution, compare the results with what would have happened if everyone had played the solution strategy, by redoing the last two columns in your table. If there is no known solution to the game, then subjects are evaluated more directly on their play. You should provide a justification of your evaluation method. Thus the report should include tables that show which roles each of

the class subjects played in your experiment, the number of points the person received in the games he or she played, and a break down of those points.

- The second part of the report should also explain the main features of the 2. sample population of subjects, using statistics and econometrics to help summarize the data from your experiment. Explain the main features in your data that summarize the behavior of the class as whole, by looking over the bidding distribution within the experimental population. Summarize the results and provide an interpretation in your report. You should use bar charts, pie diagrams and other relevant graphical devices to illustrate your points. When arguing how well the theory works you should know how to adjust for sampling error with t statistics, confidence intervals and so on. By all means, estimate some parameters of interest to your research questions, provide some confidence intervals, and test some hypotheses of interest to your project. Be sure to focus on the extent of deviations in the experimental outcomes from the theory, seeking to explain why. (Did some subjects fail to optimize in all the rounds, or did people learn? Do subjects individually mix or does the population simply divide into proportions that give the appearance of mixing to any individual player facing an anonymous opponent?)
- 3. Finally in the light of the class evidence, how does this compare with your own experimentation before the class? Is class behavior "closer" to "mutual best responses" (Nash equilibrium) than your pre-class trials? Are there backwards induction aspects that were too challenging to solve in a short amount of time that could be handled by you as designer of the game? Or did the class do a better job of finding an approximate solution to the game than you did? How would you modify the predictions of your game in the light of the experimental results? Can this be informative beyond the class, and if so in what way?