"Using Extra Credit in a Student Game Theory Simulation"

AEA Economics Education Poster Session 2013

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Research has been done showing the benefits of active learning including experimental and simulation learning. Experiments and simulations place students within the subject by putting them in roles that require them to make economic decisions. It is also a welcomed break for students from the typical day of lecturing and note taking. The purpose of the experiment is to use an incentive based method to show how game theory, and specifically the prisoners' dilemma, works in a less abstract setting. While game theory is briefly touched on in most principle of microeconomic books I place more emphasis on the topic and incorporate an experiment to emphasize how firms make decisions based upon their expectations of other firms.

In order to get the most out of this Prisoner's Dilemma and to eliminate as much bias as possible the experiment needs to be conducted prior to presenting on the topic. The experiment is done by selecting two students from the class. The selection process can be done a number of ways, students could volunteer, students could be randomly drawn from a hat or using a random number generator, or various other ways. I used a method where I told the students they had the potential chance to earn extra credit and the two closest guessers to the number of M&Ms in a jar were going to be selected for the experiment.

The two students are then separated and not allowed contact until the unveiling process. One student is taken in the room and explained that they can either share extra credit or take extra credit. A slip of paper is then put into an envelope secretively and they leave the room. The next student is brought in and the procedure is repeated for them. Both players can see the game theory diagram shown and the payoffs represent the amount of extra credit that they will receive in the cells. The cell showing (-3,-3) does not mean that points are taken away from the students but rather the students participating get 0 extra credit points while the rest of the class will get 3 points each. This gets the rest of the class involved in the experiment hoping that both students will be greedy and choose "take".

		Student 2	
		Share	Take
Student 1	Share	(3, 3)	(0,6)
	Take	(6,0)	(-3,-3)

The envelope is then opened and the players' decisions are then shown to the classroom and the appropriate points are given based on their choices. The payoff matrix is designed to give the same dilemma that comes from the prisoners' dilemma with the Nash Equilibrium being "Share, Share" but the likely outcome being "Take, Take". This is then the opportunity to debrief and explain what outcome you should expect and why. The debriefing process is a good lead in into the power point presentation which looks at more examples and ties in directly to how oligopolist firms behave. The power point presentation also shows different strategies and equilibria. After the presentation the game can be repeated to incorporate the concept of how collusion impacts a firm's strategy. The game would be done again but allowing time for the students to strategize. Because students still might be greedy, much like firms, there is always the incentive to cheat knowing. Therefore the idea of a cartel is incorporated in a semi-real life situation.

While the experiment itself is not evaluated there is a homework set which covers concepts and terms which relate to Game Theory. The unit exam also covers concepts from the experiment as well as the presentation. Topics evaluated include but are not limited to finding a Nash Equilibrium, whether or not a player has a dominant strategy, Prisoner Dilemma outcomes and the reasons behind it, and collusion and cartels. Students, including those who did not directly participate, were able to apply what was presented and answer questions correctly on both the homework assignment and exam. Responses from 1-minute paper and student evaluations suggested that the students enjoyed not only the game but they also liked the whole topic. It came from numerous students and not just those who had specifically participated in the game, which gives evidence that on-lookers may still enjoy an experiment that they are not directly involved in.

For more information or my Game Theory power point presentation, please go to my website http://cba.unl.edu/people/jamievolz. You may also email me at jamief.wagner@gmail.com.