Issue Analysis # 1 Coronavirus and Game Theory

Instructions

1. Select a current real world issue.
2. Write a short essay (1.5 spaced, 2 pages max) on how the current issue relates to principles and concepts covered in this course. The aim is to show your understanding of the subject matter and apply it to current events/business settings.
3. Submit your essay in PDF format to this assignment item.

The coronavirus pandemic can be seen through the lens of the "Prisoner's dilemma" game. This prisoner's dilemma game is played by every individual against his/her population. It is a very complex game because every person in the world is involved in it. Every person in the world has a choice. The payoff for their choice is dependent on what other people do. Every person in the world has the choice to wear the mask and do social distancing. However, wearing a mask and doing social distancing comes with its fair share of negative points. First of all there is the physical discomfort of wearing a mask and doing social distancing. Next, there is the mental strain and psychological stress that people go through. Looking at a simplified version of the game where there are only two types of activities, one for quarantine such as staying at home with only limited social activities and another for more regular social activities, the question is what the individual must do. It depends on what the whole population would do. If the whole population takes the first option, the person might take the second option. However, if everyone else discovers this, they all will all do the same thing. However, this will increase the risk of contracting the disease for all. Everyone will then go to the first option. The whole process repeats. In this simplified version of the game, it could be looked at as a sequential game because the

player knows how the rest of society is behaving. However, this is a very simple game and in order to model real life scenarios, we can make the game more complex. Each individual can spend a certain part of his/her time for quarantine and the rest for free-social activities. If this is done then, the whole population will reach an equilibrium with a fraction in quarantine and the rest in free social activities. This situation has been observed in real world communities where social activities were not completely closed but not fully opened also. More complex game theory models can also include the concept of complex social connections.

Taking the vaccine is also another point of interest when it comes to the coronavirus. People are benefited by taking the vaccine because they are then protected. On the other hand, the side effects of the virus is the negative point. People in some areas might decide to not get the vaccination if they see that the infection rates are lower. However, if everyone thinks the same way, then it is quite dangerous for everyone.

Another interesting subfield in the application of game theory in the coronavirus is to answer the question would affected communities voluntarily obtain herd immunity if a cure for the coronavirus was available. In this game, “costly commitments” (vaccination) are required of a fraction of the population to reach a “critical level” needed for herd immunity. If this does not happen, the defectors are punished by the epidemic. Game theory can also be used to predict potential vaccine accessibility. In fact it has already been used in the Haiti cholera epidemic ad the H1N1 vaccination campaign. Equilibrium solutions were identified which represent how individuals may select vaccination centers in a research paper. When a centralized planner has the ability to assign people to facilities, it allows the planner to implement equilibrium solutions where no individual can do better by switching facilities.