Choice Waves and Strategic Interaction

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ABSTRACT

The Choice Wave provides a conceptual and mathematical framework for probabilistic choice leading to one or more utility maximizing outcomes chosen independently at various decision points. Individuals or groups of individuals (known as Consumer Types in market settings, or otherwise as Choice Types) that can successfully be represented by a Choice Wave are statistically independent from all other consumers or Choice Types represented by different Choice Waves due to the orthogonality of each Choice Wave. Yet, there exists the possibility that individuals may interact strategically with other individuals that may be represented by Choice Waves different from their own. Given that a Choice Wave represents the complete set of utility maximizing choices, each of which has a certain probability that the individual will select that choice at the decision point, there necessarily is an expectation value associated with each Choice Wave that indicates the most likely outcome or outcomes. Two or more outcomes may certainly have equivalent likelihood of occurrence, depending on the tastes and preferences and other factors, which are included in the form of the Choice Wave. In general, each Choice Type exists within its own hyperspace such that the behavior and preferences of individuals in one Choice Type are statistically different from those of all other Choice Types. However, when the potential for strategic interaction between individuals in one Choice Type and individuals in another Choice Type exists, there exists the logical possibility that the probabilities of utility maximizing outcomes may change. Different Choice Types may respond differently to being confronted with strategic interactions much in the same way that they may respond differently to information. However, information, once provided, is static, unlike individuals, who have the capacity to act in accordance with their own utility maximizing strategies. Thus, the utility maximization problem at a decision point in the presence of a strategic interaction situation is not merely related to the individual's own Choice Wave, but is also conditional on the Choice Waves of other individuals with which the interaction is taking place. This poses an interesting question, since two Choice Types are supposed to be different in terms of behavior and preferences, and therefore not influence each other's decisions. Such differences, however, logically do not apply to strategic interaction. Even the most different of individuals may interact strategically. For example, nations with diametrically opposed political and social views may be involved in a war despite being otherwise statistically independent in terms of behavior and preferences. The scenario is one of Nash Equilibria, in which strategic interaction between two or more players yields a dominant or multiple strategies for the players. The pre-interaction expectation values of

the Choice Waves of the players may provide additional insight into the most likely outcome of the game once strategic interaction takes place and the expectation value is conditional upon the Choice Waves of the other players, whether it is a game with a dominant strategy or multiple strategies. Additionally, because the players exist in separate hyperspace, if their outcome is influenced by strategic interaction, then their very interaction in the game, the game itself becomes a new entity with its own Choice Wave that is a linear combination of the Choice Waves of each player. The game itself becomes the entity that is making the final decision, which does not take place until each player makes a decision, each of which is conditional on the decisions of other players. Therefore, during the period of strategic interaction, the players exist within a new hyperspace that is shared by all players. For example, two sports teams, A & B, playing each other have their own possible outcomes, i.e., win, lose, or tie, each of which is dependent upon the outcome of the other player. The game itself has its own possible outcomes, i.e., A wins, B wins, A and B tie. The outcome of each team is contingent upon the outcome of each team, and the outcome of each of the teams is contingent upon the outcome of the game. Insofar as the utility maximizing decision possibilities of each team may legitimately be modeled by a Choice Wave orthogonal to the Choice Wave of the other team, then the game itself may be modeled by a Choice Wave that is a linear combination of the Choice Waves of the two teams, thereby placing the two teams, during the period of the game, on a new hyperspace that they both share. The game may be thought of as making a collective choice that yields a certain outcome, which is a linear combination of the outcomes of each team.