Abstract

Modeling Free Choice in Games

The free and independent choices that game theory assumes are, on occasion, constrained by the game form postulated and its associated rules of play. Thus, if a game in normal (or strategic) form has a unique Nash equilibrium in pure strategies, the standard theory presumes rational players will choose it. But changing the rules of play to allow players to think ahead and move and countermove from from such an equilibrium may lead to a different equilibrium outcome, according to the "theory of moves" (TOM).

It turns out that of the 78 distinct 2 x 2 strict ordinal games, there are exactly six, subsumed by a generic "Freedom Game," in which the more far-sighted rationality calculations of TOM induce a player with a dominant strategy to depart from the unique pure-strategy Nash equilibrium associated with it and switch to its dominated strategy, which in turn induces the other player also to switch its strategy. The outcome that results is a "nonmyopic equilibrium" (NME)—based on a set of rules that makes the order of play endogenous and assumes players will not cycle—that benefits one and sometimes both players.

A second set of new rules, which assumes that cycling is possible, affords the players still more freedom of choice. However, this freedom may be limited by the exercise of "moving power," which is the ability of one player to outlast the other player in the move-countermove process. Both sets of rules not only help one understand real-life choices players have actually made—some of which proved surprising—but also facilitate modeling dynamic processes that, by expanding the possible moves of players, enhance their freedom of choice.