Neighbors versus Strangers in a Spatial Interaction Model

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Abstract:

In this paper, we study an evolutionary model of spatial interaction among individuals with different information. Time is discrete and in each period, individuals from a finite population are randomly paired to play a 2×2 symmetric coordination game. Each individual knows the structure of the game.

The first innovation of this paper is the spatial structure that differs from the ones presented by Ellison (1993) and Blume (1993). The notion of neighborhood which we use is much wider: individual j is a neighbor of individual i if individual i has access to all past plays and payoffs of individual j, for a finite number of periods. The matching can give rise to three situations: (i) both individuals are neighbors, (ii) both individuals are strangers, (iii) one considers the other as a neighbor whereas the latter considers the former as a stranger.

Another innovation of this paper is that the decision rule used by the individuals is contingent to the opponent. When an individual faces one of his neighbors, he draws a

sample from his opponent's past action, and plays his best reply to the sample, as in Young (1993, 1998). In the case he faces a stranger, he draws a strategy-payoff pairs sample from individuals that belong to his neighborhood and plays the strategy that paid the highest payoff, as in Josephson and Matros (2001). The intuition behind this decision rule is the following: when an individual i faces someone from his neighborhood, he may want to try to anticipate his opponent action, since he can access his opponent's past decisions and performances; but when individual i faces a stranger, he has no information about his opponent and may want to ask around in order to imitate his most successful neighbor.

In any 2×2 symmetric coordination game that contains both, risk dominant and Pareto efficient equilibria, we prove that the Pareto efficient equilibrium is always selected. This contrasts with the result obtained by Ellison (1993), Young (1993) and Kandori, Mailath and Rob (1993), but is consistent with Matros (2004). By simulating different population structures, we also show that the speed of convergence is positively correlated with the numbers of imitators.

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