

Emergent Network Dynamics and Strategic Social Interactions

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Abstract: In all social and economic interactions, individuals or coalitions choose not only with whom to interact but how to interact, and over time both the structure (the with whom) and the strategy (the how) of interactions change. Our objectives here are to model the structure *and* strategy of interactions prevailing at any point in time as a directed network and to address the following open question in the theory of social and economic network formation: given the rules of network formation, the preferences of individuals over networks, the strategic behavior of coalitions in forming networks, and the trembles of nature, what network dynamics are likely to emerge and persist. Our main contributions are (i) to formulate the problem of network formation as a dynamic, stochastic game, (ii) to show that this game possesses a stationary correlated equilibrium (in coalitional network formation strategies), and (iii) to show that, together with the trembles of nature, this stationary correlated equilibrium determines a network dynamic which respects the rules of network formation and the preferences of individuals. Moreover, we show that this emergent network dynamic possesses a nonempty set of ergodic measures and generates a finite, disjoint collection of nonempty subsets of networks, each constituting a basin of attraction. The results we obtain here for endogenous network dynamics and stochastic basins of attraction are the dynamic analogs of our earlier results on endogenous network formation and strategic basins of attraction in static, abstract games of network formation (Page and Wooders, 2008). During the course of the paper, we also relate our work to several important contributions in the literature, including those listed below.

References

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