Peer Effects and Stability in Matching Markets: The advantage of social network structure

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Abstract

Many-to-one matching markets exist in numerous different forms, such as college admissions, matching medical interns to hospitals for residencies, assigning housing to college students, and the classic firms and workers market. In all these markets, externalities such as complementarities and peer effects severely complicate the preference ordering of each agent. Further, research has shown that externalities lead to serious problems for market stability and for developing efficient algorithms to find stable matchings. We note that peer effects are often the result of underlying social connections, and we explore a formulation of the many-to-one matching market where peer effects are derived from an underlying social network. The key feature of our model is that it captures peer effects and complementarities using utility functions, rather than traditional preference ordering. With this model and considering a weaker notion of stability, namely two-sided exchange stability, we prove that stable matchings always exist and characterize the set of stable matchings in terms of social welfare. To characterize the efficiency of matching markets with externalities, we provide general bounds on how far the welfare of the worst-case stable matching can be from the welfare of the optimal matching, and find that the structure of the social network (e.g. how well clustered the network is) plays a large role.

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Biography

Elizabeth Bodine-Baron is a graduate student at the California Institute of Technology in Pasadena, CA. She received the B.S. degree in electrical engineering and the B.A. degree in Plan II Honors from the University of Texas at Austin in 2006 and the M.S. degree in electrical engineering from Caltech in 2009. Her research interests include social networks, distributed algorithms, and game theory. Ms. Bodine-Baron is a recipient of the NDSEG Fellowship and the Atwood Fellowship.