Short Research Statement
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My research focuses on social and economic networks, particularly in models of social learning, local public goods, peer effects, and the formation of social capital. A recurring theme is capturing aspects of networks through theory-based summary statistics that can be useful in empirical studies and policy analyses.

Social learning and influence are central to consumer choice, financial decisions, and political behavior. One strand of my research considers networked agents being influenced by each other over time. The updating of their beliefs and behaviors is modeled by simple linear rules. [13] asks which features of networks ensure that large groups will learn well. Small groups that are prominent or *central*—influencing many others directly or indirectly—turn out to be an important obstacle to efficient learning. [15] focuses on how social learning is affected by *homophily*, the tendency of people to socialize most with demographically similar others. Under suitable statistical assumptions about the network, homophily slows agreement in proportion to a group-level measure of segregation called *spectral homophily*. [14] examines sampling biases that complicate empirical estimation of information diffusion. After accounting for these biases, simple branching process models turn out to be a remarkably good fit to viral diffusion on the Internet. Finally, [23] surveys progress and unresolved challenges of social learning theory.

A second agenda studies how groups cooperate when externalities are complex. For example, countries can, at a cost, pollute less. Due to geography and other asymmetries, the benefits of a given such effort are not distributed uniformly. [7] studies the prospects for cooperation in such a setting by defining a network reflecting marginal externalities. The *spectral radius* of the externality network quantifies the collective returns to investment in public goods. We use this measure to characterize players who are essential to negotiations, and to describe when negotiations can be subdivided without much loss. Methodologically, the results open new connections between the structure of general equilibrium, on the one hand, and the theory of networks and centrality measures, on the other.

A third strand of work looks at the externalities of financial contagion in a network of interlinked institutions. When firms experience defaults or shutdowns, value is lost by direct counterparties that have stakes in those firms (through debt, equity, or other claims), but also by indirect counterparties that have claims on those directly affected. The question of [8] is how the network of dependencies propagates the costs of shutdowns and how that ultimately redounds to consumers. We show that the amount of damage caused by financial contagions can be nonmonotonic in both the *diversification* of the network (the typical number of direct counterparties) and in its *integration* (the depth of the typical financial relationship). Increasing either of these can exacerbate contagions but can also absorb shocks. The paper suggests ways for policymakers to assess the tradeoff. A related project, [1], studies externalities *across* different financial networks. We posit that firms' insolvency spills over across networks, and show that this can make the contagions of [8] more stark and discontinuous.

A fourth agenda studies games in networks under incomplete information [20, 21]. We model agents who differ in (i) whom their payoffs depend on; (ii) what information they have; and (iii) how they interpret information. Our key methodological innovation is a new representation that captures network relationships and information asymmetries simultaneously. Using this representation along with Markov chain techniques, we unify existing results from network games and classical incomplete-information games, such as beauty contests. We illustrate the techniques by deriving their implications for phenomena in finance, such as *contagion of optimism* in speculative trade.

Finally, a new experimental program, [2,3], focuses on how agents decide whether to participate in information exchange, whom to talk to, and what to ask. These decisions are critical to shaping the networks of influence studied in the first strand mentioned above. One reason not to ask questions (e.g., about farming) is a fear of signaling a bad attribute (e.g., being an unskilled farmer) to someone whose opinion one cares about. In field experiments, we vary whether there is scope for signaling ability by asking questions, and examine how that affects information-seeking behavior. We find large effects—a twofold reduction in information-seeking when signaling concerns are present. These magnitudes are comparable to caste-based communication frictions. Importantly, our measured effects depend on social structure in predictable ways. For instance, signaling is less of a concern between friends. Thus, the phenomenon we study can reinforce the homophily mentioned above, leading to slow convergence in beliefs and sustaining pockets of ignorance even when information is plentiful within a community.

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