

Research Opportunities in the Study of Social and Economic Networks

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Abstract: Social network patterns of interaction influence many behaviors including consumption, career choice, employment, investment, voting, hobbies, criminal activity, risk sharing, and even participation in micro-finance. Networks of relationships among firms and political organizations also impact research and development, investment decisions and market activity, international trade patterns, and political alliances. The study of how network structure influences (and is influenced by) economic activity is becoming increasingly important because it is clear that many classical models that abstract away from patterns of interaction leave certain phenomena unexplained. For example, the fact that information about jobs is largely disseminated through social networks has significant implications for patterns of wages, unemployment, and education. Beyond the many economic settings where social structure is critical, the study of social and economic networks can also benefit from an economic perspective. Tools from decision theory and game theory can offer new insight into how behavior is influenced by network structure; and can also be used to analyze network formation. In addition network analysis provides new opportunities and challenges for econometrics, laboratory and field experiments; and they are beginning to shed new light on the impact of social interactions ranging from favor exchange to corruption and economic development.

Our beliefs, decisions and behaviors are influenced by the people with whom we interact. Examples of the effects of social networks on economic activity are abundant and pervasive, as social interaction plays a key role in the transmission of information about jobs, new products, technologies, and political opinions. Networks also serve as channels for informal insurance and risk sharing, and influence decisions regarding education, career, hobbies, criminal activity, and even participation in micro-finance. Beyond the role of social networks in determining various economic behaviors, there are also many business and political interactions that are networked. Networks of relationships among various firms and political organizations affect research and development, investment decisions, patent activity, trade patterns, and political alliances.

Given their importance, the study of social and economic networks is expanding rapidly and naturally cuts across many disciplines including economics, sociology, anthropology, education, political science, applied mathematics, statistical physics and computer science. It is an exciting area not only because of the explosion of "social networking" that has emerged with the internet and other advances in communication, but also because of the fundamental role that many varieties of social networks play in shaping human activity. Social network analysis has already taught us a great deal and it holds tremendous potential for future application, especially in economics.

The study of social networks has a rich history in sociology, with a variety of detailed case studies, theories of social structure, and a perspective of social structure being symbiotic with social behavior. The sociology literature includes the seminal references on studies of opinion leaders, homophily (the tendency of similar individuals to associate with each other), strength of ties, and many other things. Nonetheless, a substantial portion of the current explosion in the study of social networks comes from expansions outside of sociology. The other disciplines have much to contribute because they bring new perspectives on applications, as well as new tools for analyzing social interactions. As an example, it was noted early on in both the sociology and economics literatures that substantial amounts of information about job opportunities often comes from friends and acquaintances. Despite this observation, there was limited study of the wage and employment implications of that fact. It was only in the last decade that it has been shown that incorporating network-based models of job information provides significant new insights into patterns of unemployment, time series of wages, and persistent racial wage gaps.

Let us briefly outline in turn these two important dimensions of economic studies of networks: supplying new perspectives on the role of networks in many applications, and providing new tools for analyzing social interactions and their relation to human behavior. These are complementary aspects of the study of networks, and suggest abundant and pressing areas for research.

The study of how network structure relates to economic activity is becoming increasingly important because many classical economic models that abstract away from patterns of interaction are unable to provide insight into certain phenomena. For instance, stylized views of markets as anonymous systems miss details that are critical in understanding many empirical patterns of trade, prices, and resulting inefficiencies. As mentioned above, the role of social networks in disseminating job information affects wages and unemployment patterns, and has implications for inefficient investment. Other important questions of how patterns of interaction

affect economic outcomes include: How does price dispersion in markets depend on network structure? How do new market technologies (e.g., the internet) change interaction patterns, the efficiency of markets, and which goods are traded? How do the patterns of liabilities among financial intermediaries relate to the potential for financial contagion? How are education and other human capital decisions influenced by social network structure? More generally, when and how are consumption and voting patterns influenced by friendships and acquaintances and what does this imply for efficiency in decision making? How do people learn and communicate by word of mouth? Will the networks of interactions that emerge in a society be the efficient ones in terms of their implications for economic growth and development? As an encouraging example, the recent awakening of network research in development economics has provided exciting new insights into a diversity of important questions such as how people choose production technologies in agriculture, how they share risk and exchange favors, and how they learn about new programs and opportunities.

A second important area of the study of networks from an economic perspective derives from the fact that economic tools and reasoning are very useful in analyzing both network formation and network influence, and these tools are quite complementary to those from other disciplines. That is, even beyond the implications of network structure for economic activity and welfare, economic reasoning provides important new insights regarding how people self-organize and why certain patterns will emerge. Particularly effective economic tools come from decision theory, behavioral economics, and game theory. These sorts of reasoning can be used to predict behavior along the lines discussed above: which choices people make and how choices depend on friends' choices; and such reasonings are also very useful in analyzing network formation. For example, explicit modeling of individual choices can help us to understand homophily: why people tend to associate with other people who are similar to them along a number of dimensions. It also provides new implications for resulting behavior, including how students' study habits and human capital investment decisions depend on their peers' and how the choice of their friendships relate to these choices. It also provides new insights into why the average social distance between people is so small even in very large societies and what this implies for the spread of information.

In addition to the modeling tools that economics can provide, new econometric and statistical techniques are needed (and starting to emerge) to analyze network data and improve our understanding of peer effects in many areas. Empirical analyses of social interactions provide many issues for research in applied econometrics, as well as opportunities in experimental economics, both in the lab and in the field. In particular, the endogeneity of social structure leads to a pervasive problem in analyzing behavior as a function of social structure. Do friends behave similarly because of their influence on each other, or are they friends because of their

similar behavior, or even because of some latent trait that correlates with their behavior? Given this, and other related issues that lead to hurdles in determining causality, it is important to base empirical analyses of social and economic networks either on careful structural models that account for endogeneity, or to be able to take advantage of laboratory, field, or natural experiments to control for that endogeneity. One very positive aspect in this regard is that recently emerging research in networks exhibits natural and healthy interactions between theory, empirics, and econometrics.

In summary, there are many important and pressing areas for the study of social and economic networks. This derives from the facts that (i) there are many instances where the network patterns of interactions are fundamental to understanding emergent economic behaviors, (ii) economic reasoning can lead to new insights regarding social interaction patterns, and (iii) the endogeneity of social interaction presents challenging hurdles in interpreting data that requires the use of structural models, new statistical tools, and various field and laboratory experiments. Thus, the study of social and economic networks provides many exciting opportunities.

Three References to Relevant Readings:

David Easley and Jon Kleinberg (2010) *Networks, Crowds, and Markets: Reasoning about a Highly Connected World*. Cambridge University Press: Cambridge UK.

Matthew O. Jackson (2008) *Social and Economic Networks*, Princeton University Press: Princeton, NJ.

Stanley Wasserman and Katherine Faust (1994) *Social Network Analysis: Methods and Applications*, Cambridge University Press: Cambridge UK.

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