Dissertation abstract of Jaekyeong Shin

This dissertation studies the peer effect on social networks and its estimation techniques based on the spatial autoregressive model. I focus on the different natures of peer effects and their policy implications. The distinct characteristics of peer effects are captured by an econometric model, and it is shown that they can be inferred from the structure of networks.

In the first chapter, I propose a generalized version of the spatial autoregressive model (GSAR), where the complementary and conformity motives of peer effects are bridged by a conformity parameter estimated along with the peer effect. A microeconomic foundation is built to clarify the implication of the parameter. I describe an individual's utility function as a sum of the network and private utility. Then, the conformity parameter identifies the relative magnitude of the two components. Also, the definition of the social multiplier effect is extended to incorporate the different outcomes depending on the underlying motives. From the definition, I derive a threshold for a positive social multiplier as a function of the peer effect and the conformity parameter. It suggests that the positive multiplier arises only when the complementary benefit is sufficiently higher than the conformity motive.

In the second chapter, I examine the microfinance data collected by Bharatha Swamukti Samsthe in Karnataka, India. The dataset contains rich dimensions of the social networks of the villagers living in the rural area of southwest India. I apply the GSAR model to the data and find strong evidence of the villagers' peer effect and conformity motive. Also, I find a negative social multiplier effect, which suggests that the common strategies based on the complementarity peer effect may be less effective. For policy implication, I propose a measure of centrality based on the Alpha centrality. This departs from the other concepts by reflecting the heterogeneity of individuals in a network and focusing on those most likely to change their behavior. I also discuss the theoretical differences between the diffusion and the SAR models and show that the SAR model will be a better description if a researcher believes that the individuals can decide to join the program, even a long time after they learn about microfinance.

In the final chapter, I study the case where network data is unavailable. Using panel data of repeatedly observed samples with binary outcome variables, I estimate a network structure without preliminary knowledge as a weighted graph. Also, I present an algorithm that combines a shrinkage estimator with the nested-pseudo likelihood algorithm for faster computation of sparse networks. Simulation results for different types of networks are presented, with an extension to the estimation of an unweighted graph.