Network Centrality, Optimization, and Empirical Analysis

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Abstract

This paper examines the microfoundation of network centrality and formalizes the network effects in the situation where an agent's contribution to others circulates in a network. This effect corresponds to the Japanese proverb "*Nasake ha hito no teme narazu* (What goes around, comes around)". The existence of this effect is tested by data obtained from Japanese university students.

The following results are obtained: (1) Equilibrium activity levels depend on the subgraph centrality proposed by Estrada and Rodriguez-Velazquez (2005). (2) The construction of the utility function avoids endogenous estimation problems in the empirical analysis. (3) We can avoid the problem of divergence in the centrality index. Findings (2) and (3) stand in contrast to the model in Calvó-Armengol et al. (2009). Under the empirical model, significant network effects are obtained.