

# Econometric Aspects of Network Analysis

## Course syllabus

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### Introduction

The analysis of network effects in economics focuses on the relationships between actors. Actors and their actions are viewed as interdependent rather than independent units. When making decisions, individuals are influenced by the behaviour of others around them. Central questions concern characterizing the structure of networks, explaining their genesis, and considering the effects of network structure and of units' location within it on units' actions. Methods for network analysis have originated primarily in sciences (physics, biology, computer-science) and mathematics. The importation of statistical concepts, theories, and methods into economics is a remarkable feature of economics research during the last twenty years. At the empirical level, the most useful methodological tools come from spatial statistics and spatial econometrics but those technicalities cannot be applied in economics uncritically. For example, the distinguishing of common exposure from interdependence sources of spatial association becomes crucial in economics, in particular for policy purposes. Issues of group formation, *i.e.* selection, are important concerns when the data are analyzed in the social rather than geographical space.

### Course Description

This topics course focuses on the empirical analysis of economic and social networks. Salient examples include (but are not limited to) friendship networks among adolescents, co-authorship networks among scientists, trade networks between countries and financial networks between banks. In particular, the course is going to provide an overview of the different models and methods for analyzing data with cross-sectional dependence, *i.e.* those able to explicitly test behavioural models with interdependent agents' decisions. The main emphasis is on identification issues. The challenges include (i) the definition of the reference group (ii) the possible presence of unobserved attributes that may generate a problem of confounding variables (spurious spatial correlation) (iii) a simultaneity in agents' behavior that may hinder identification of exogenous effects (*i.e.*, the influence of agents' attributes) from endogenous effects (*i.e.*, the influence of agents' outcomes).

### Readings

The course is based on the recent papers collected in Part III of the compendium:

***Economic Analyses of Social Networks***, Jackson, M.O. and Y. Zenou eds., Edward Elgar Publishing, 2013

### Related Texts

Anselin, L. *Spatial Econometrics: Methods and Models*, Dordrecht: Kluwer Academic Publishers, 1988

Cliff, A. and J. Keith Ord, *Spatial Processes, Models and Applications*. London: Pion, 1981

Cressie N., *Statistics for Spatial Data*, revised edition, Wiley, NY, 1993

Goyal, S., *Connections: An Introduction to the Economics of Networks*, Princeton University Press, 2007

Ioannides, Y. M., *From Neighborhoods to Nations: The Economics of Social Interactions*, Princeton University Press, 2012

Jackson, M.O., *Social and Economic Networks*, Princeton University Press, 2008

Wasserman, S. and Faust, K. *Social Network Analysis: Methods and Applications*. Cambridge University Press, 1994