Econometrics Journal (2017), volume **20**, pp. 3–5.
Article No. ectj??????

Special Issue on Econometrics of Networks

Received: October 2017

EDITORIAL

The Editorial Board of *The Econometrics Journal* occasionally commissions Special Issues on subjects of current interest and importance. The Econometrics of Networks is such a subject. Data on networks of individuals, firms, regions, etcetera, are increasingly available and allow for detailed analysis of the economic and social interactions that shape our world. The careful analysis of networks and the interactions that they facilitate requires advanced and often new econometric models and methods. This Special Issue contains seven papers that offer such advances in the economic analysis of networks. They cover methods for the empirical analysis of both network formation and the effects intermediated by networks, with applications to peer effects, regional growth spillovers, international trade, and market microstructure in finance. They were selected for the Special Issue in an editorial process overseen by Jaap Abbring, then Co-Editor and now Managing Editor, and Áureo de Paula, Associate Editor of *The Econometrics Journal*.

Karyne Charbonneau opens with an analysis of binary choice models with multiple fixed effects. Such models naturally arise in network economics when the existence of links in a network or choices and outcomes on these links depend on the unobserved characteristics of the nodes they connect. Modelling such node-specific effects as fixed effects give rise to an incidental parameter problem: The number of parameters increases with the number of nodes in the sampled network. It is well known that panel logit models with a single fixed effect can be estimated consistently with conditional maximum likelihood. In her article, Karyne Charbonneau shows that this method can be extended to logit models with multiple fixed effects and demonstrates its use in an application to international trade relationships.

Vincent Boucher and Ismael Mourifié follow with a study of the econometrics of strategic network formation in large populations. They focus on measuring the parameters of individual utility functions from data on a single, large social network that is modelled as an exponential random graph. Their main contribution is to provide a logit based estimation method that is both easy to implement and fast, for the case in which payoffs from link formation decay with differences or distance between individuals. They demonstrate this method's applicability using a popular source of peer effects analysis, the National Longitudinal Survey of Adolescent Health (Add Health).

Christiern Rose provides a novel approach to the identification of peer effects over social networks.. Following the literature, he distinguishes two types of peer effects: endogenous effects— the effects of peer outcomes—- and contextual effects— the effects of peer characteristics. He notes that, under appropriate variance restrictions, these effects have different implications for the covariances of outcomes between peers and those between peers of peers, even in the presence of the confounding ("correlated") effects of unobserved common determinants of network outcomes. He uses this to empirically separate both

types of peer effects. Using the approach, he finds evidence of peer effects in reading and mathematics among first year kindergarten students.

Francesco Moscone, Elisa Tosetti, and Veronica Vinciotti propose to apply the Graphical LASSO, a penalized likelihood procedure for the estimation of the (inverse) covariance structure of a multivariate normal distribution, to averages of disjoint blocks of observations to estimate the spatial dependence of Gaussian variables over huge networks. This method assumes that the dependence only varies between and not within blocks of observations and simplifies computation when networks are large. Francesco Moscone et al. apply their method to the analysis of growth and convergence of a large number of small European regions.

Zhongjian Lin and Haiqing Xu present a model of peer effects over a large network that allows these effects to vary with the peers' "social influence," as measured by their centrality in the network. They adapt the nested pseudo likelihood procedure for the estimation of dynamic discrete games to this model's estimation. They subsequently use the resulting estimator for measuring peer effects in risky behavior among high school students, using Add Health data. They find that the effects of more central peers are stronger.

Xiaodong Liu, Eleonora Patacchini, and Edoardo Rainone also study peer effects in the Add Health data, but focus on bed time decisions. They note that the Add Health data only provide outcomes for samples of peers and extend an existing nonlinear least squares estimator that allows for such sampled data with network fixed effects. Application of this method to the Add Health data establishes that high school students' bed time decisions are affected by their friends' bed time decisions.

This Special Issue's final paper, by Lada Adamic, Celso Brunetti, Jeffrey H. Harris, and Andrei Kirilenko exemplies the wide relevance of the econometrics of networks, with an application to micro marketstructure in finance. It studies trader networks in the market for e-Mini S&P 500 futures contracts. It establishes a central, leading role for network characteristics in predicting financial market outcomes.

The seven papers of this Special Issue provide a range of novel methods for empirical network analysis and demonstrate the exciting possibilities for applied research the econometrics of networks opens up. Before we leave the reader to enjoy these contributions in more detail, we would like to thank the referees who assisted us. Without their help, this Special Issue would have not been possible.

Jaap H. Abbring
Managing Editor
The Econometrics Journal

Department of Econometrics
and Operations Research
Tilburg University
P.O. Box 90153
5000 LE Tilburg
The Netherlands

Áureo de Paula

Associate Editor
The Econometrics Journal

Department of Economics
University College London
30 Gordon Street
London WC1H 0AX
United Kingdom

October 2017