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Editors' introduction

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Editors' introduction

Theoretical and Financial Econometrics

This annals issue is in tribute of Christian Gourieroux's contributions to theoretical and financial econometrics. It grew out of the conference in honor of Christian Gourieroux organized by Serge Darolles and Nour Meddahi, held in University Paris-Dauphine on December 4-5, 2014.

The sixteen articles of this issue are divided into five broad areas. A first set of four papers is devoted to general methodological issues for parametric and semi-parametric inference. The next three papers shed some new light on nonparametric identification and estimation of some structural econometric models. Then, another set of three papers sets the focus on forecasting issues while the next three papers are about empirical finance. Finally, the last three papers are about inference in continuous time models.

Note that the wish to classify papers for the sake of clarity may lead to underestimate the internal consistency of all the papers included in this annals issue. They all mix general methodological issues of statistical inference with a focus on structural modelling in econometrics, in all fields of economics, including micro-econometrics, time series macroeconomics and financial econometrics. These common features are very much in line with Christian Gourieroux's broad contributions to econometrics.

Parametric and Semi-Parametric Inference

The first paper, co-authored by **Gagliardini** and **Gourieroux (2017)**, present a new use of big data for estimation of interactions between the individual behavior of economic agents. These interactions are usually represented by matrices, whose generic element of index *(i,j)* measures the magnitude of the interaction from individual *i* to individual *j*. Interesting examples include the diffusion of systemic risk in a financial sector or the observations of the traded volumes between a set of buyers and a set of sellers. Sometimes, the observed matrices are symmetric, for instance when they measure the social distance between individuals with social interactions such as friendship, acquaintance, collaboration. The interactions are usually modeled by factor analysis and the factor values are estimated by standard methods such as Principal Component Analysis (PCA) or other reduction techniques. However, these estimation techniques require a number of computations much larger than the number of data. For estimation of interaction models, the authors consider specifications with unobservable row and column factors. They estimate the factor values by a methodology inspired by the classical Instrumental Variable (IV) approach. They show that this estimation strategy has a smaller degree of numerical complexity compared to PCA, while it achieves the same asymptotic statistical efficiency when instruments are optimally selected. The approach is extended to time series of interaction matrices, that is, to triply indexed observations.

Dynamic models with latent variables play a central role in many econometric fields. The standard filtering techniques cannot be used when the measurement density is not available.

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