PH.D. GRANT IN STATISTICS/ECONOMETRICS (2016-2019) IN TOULOUSE SCHOOL OF ECONOMICS FUNDED BY THE ERC POEMH

ERIC GAUTIER

One Ph.D. grant can be funded via the ERC POEMH in Toulouse School of Economics at University Toulouse Capitole for the period 2016-2019.

1. The POEMH project: Parsimony and Operators for Endogeneity and Multiple Sources of Unobserved Heterogeneity

Unobserved heterogeneity and endogeneity are prevalent notions throughout econometrics. Most of the literature focuses on scalar unobserved heterogeneity. But it implies strong restrictions on the heterogeneity of the behaviour of economic agents. This is the case in a binary treatment effect model where scalar unobserved heterogeneity and additive separability are equivalent to the restrictive monotonicity assumption used to identify treatment effects when rational agents self-select into treatment. Nonparametric random coefficients models allow for multiple sources of unobserved heterogeneity and are in line with structural economics. They are also benchmark nonseparable models and can be generalized in various ways. Due to unobserved heterogeneity, but also simultaneity (as in supply and demand models) or error in variables, econometric models of rational agents usually involve as well endogenous regressors.

The research proposal is concerned with inference on flexible models - nonparametric or high-dimensional - with multiple sources of unobserved heterogeneity and endogeneity. Nonparametric models of unobserved heterogeneity or estimation by instrumental variables usually give rise to ill-posed inverse problems. High-dimensional methods are a modern set of tools that are becoming increasingly popular in econometrics and allow to handle new data configurations with many more potential regressors than observations. They are based on convex relaxation, linear or conic programming ideas, or Monte-Carlo Markov Chains. They usually behave well when the model is well approximated by a parsimonious model where many coefficients are zero (e.g. exclusion restrictions) or there is a structured sparsity (structural breakpoints or other patterns) but the identity of the zeros (or breakpoints, etc.) are not known in advance. They also offer new tools for adaptive nonparametric

estimation. In this project, we further investigate the use of these methods to handle unobserved heterogeneity and endogeneity in various models from economics, in particular in programme evaluation, demand for differentiated products, social interactions and game theory.

The ERC POEMH is a 5 years research grant (2014-2019) in Econometrics. Interested candidates should contact Eric Gautier as soon as possible to discuss the topics that they find most interesting for their Ph.D. dissertation.

2. Scientific environment, partners and funding

The student will be supervised by Eric Gautier (Toulouse School of Economics, University Toulouse Capitole). The funding is for 2016-2019. Ideally, but not necessarily, the M2 dissertation will be carried in Toulouse and will be an opportunity to start the research on the Ph.D.

The Ph.D. can be a Ph.D. in Mathematics or a Ph.D. in Economics. The Ph.D. student will join the research groups Mathematics of Decision Making and Statistics and Econometrics and Empirical Economics.

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