A semi-parametric empirical likelihood approach for conditional estimating equations under endogenous selection

Y.G. Berger[1*] and V. Patilea[2*]
[1]Economic, Social and Political Sciences, University of Southampton, UK
[2]Center for Research in Economics and Statistics, ENSAI, France

Abstract

We propose a model-based semi-parametric empirical likelihood approach for parameters defined by conditional estimating equations. The approach takes into account of possible endogenous selection which may lead to a selection bias. We show that the proposed estimator is $\sqrt{n}$-consistent. We also show that the empirical log-likelihood ratio function is an ancillary pivotal statistics. Hence, the self-normalising property holds and inference can be based upon the empirical likelihood ratio function. The approach proposed can be used for a wide range of statistical models, such as non-separable transformation models and models with non-linear endogenous covariates. It will not be necessary to model the relationship between the endogenous covariates and the exogenous variables. This offers a major advantages over two-stage least-squares. The empirical likelihood approaches for conditional estimating equations, that can be found in the literature, are based on a number of constraints increasing with the size of the data. Our approached has the advantage of being based on a fixed number of constraints determined by the size of the parameter. This paper deals with two separate problems, but important for the practitioners: inference with estimating equations under non independent and identically distributed setup.

Keywords: Conditional estimating equations, Endogenenous covariates, Endogenenous stratification, Transformation model, Two-stage least-squares

*Address for correspondence: [1] Y.G. Berger, University of Southampton, Economic, Social and Political Sciences, Southampton, SO17 1BJ, UK. E-mail: y.g.berger@soton.ac.uk. [2] V. Patilea, Center for Research in Economics and Statistics, ENSAI, Campus de Ker-Lann, Rue Blaise Pascal BP 37203, 35172 Bruz cedex, France. E-mail: patilea@ensai.fr