Non-parametric instrumental regression: Adaptive estimation in presence of dependence

N. Asin and J. Johannes

Abstract

We consider the estimation of a structural function which models a non-parametric relationship between a response and an endogenous regressor given an instrument in presence of dependence in the data generating process. Assuming an independent and identically distributed (iid.) sample it has been shown in *Johannes and Schwarz [2011]* that a least squares estimator based on dimension reduction and thresholding can attain minimax-optimal rates of convergence up to a constant. As this estimation procedure requires an optimal choice of a dimension parameter with regard amongst others to certain characteristics of the unknown structural function we investigate its fully data-driven choice based on a combination of model selection and Lepskis method inspired by *Goldenshluger and Lepski [2011]*. For the resulting fully data-driven thresholded least squares estimator a non-asymptotic oracle risk bound is derived by considering either an iid. sample or by dismissing the independence assumption. In both cases the derived risk bounds coincide up to a constant assuming sufficiently weak dependence characterised by a fast decay of the mixing coefficients. Employing the risk bounds the minimax optimality up to constant of the estimator is established over a variety of classes of structural functions.

References

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