

On Plug-in PSMD Estimation of Functionals of Semi/nonparametric Conditional and Unconditional Moment Models
Xiaohong Chen, Yale University and Demian Pouzo, University of California, Berkeley.

Abstract

In this paper, we consider estimation of functionals of unknown parameters that are identified via the "plug-in" semi/nonparametric conditional and unconditional moment models, in which the generalized residual functions may be non-pointwise smooth with respect to the unknown functions of endogenous variables. We establish the asymptotic normality of the penalized sieve minimum distance estimator (PSMD) of any functionals that may or may not be root-n estimable. For functionals that are root-n estimable, our PSMD estimator achieves the semiparametric efficiency bound of Ai and Chen (2005). Regardless whether the functionals are root-n estimable or not, we show that the profile optimally weighted criterion function is chi-square distributed. We provide two example applications: (1) root-n efficient estimation of weighted average derivative of nonparametric quantile instrumental variables regression; (2) pointwise asymptotic normality of nonparametric quantile IV regression. A Monte Carlo study and an empirical illustration indicate the wide applicability of the theoretical results.

Keywords: Possibly Irregular functionals; Penalized sieve minimum distance; Nonsmooth generalized residuals; Nonlinear nonparametric endogeneity; Semiparametric efficiency; Confidence region; Weighted average derivative of nonparametric quantile IV regression; Pointwise asymptotic normality of nonparametric quantile IV