Set Identified Linear Models

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Abstract

We analyze the identification and estimation of parameters β satisfying the *incomplete* linear moment restrictions $E(z^\top(x\beta - y)) = E(z^\top u(x))$ where z is a set of instruments and $u(z)$ an unknown bounded scalar function. We first provide empirically relevant examples of such a set-up. Second, we show that these conditions set identify β where the identified set B is bounded and convex. We provide a sharp characterization of the identified set not only when the number of moment conditions is equal to the number of parameters of interest but also in the case in which the number of conditions is strictly larger than the number of parameters. We derive a necessary and sufficient condition of the validity of supernumerary restrictions, which generalizes the familiar Sargan condition. When B is a strictly convex set, we also construct a test of the null hypothesis, $\beta_0 \in B$, whose level is asymptotically exact and which relies on the minimization of the support function of the set $B - \{\beta_0\}$. Inverting this test makes it possible to construct confidence regions with uniformly exact coverage probabilities. Some Monte Carlo are presented.

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