On Uniform Inference in Nonlinear Models with Endogeneity

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Abstract

This paper explores the uniformity of inference for parameters of interest in nonlinear econometric models with endogeneity. The notion of uniformity arises in the models we consider, because the behavior of standard estimators of these parameters is shown to vary with where they lie in the parameter space. Consequently, inference becomes nonstandard in a fashion that is loosely analogous to inference complications found in the unit root and weak instruments literature, as well as the models recently studied in (Andrews and Cheng 2012a), and (Chen, Ponomareva, and Tamer 2011). Our main illustrative example is the standard sample selection model, where the parameter is the intercept term. ((Heckman 1990), (Andrews and Schafgans 1998) and (Lewbel 1997a)). We show that with selection on unobservables, asymptotic theory for estimating this parameter is not standard. In contrast if selection is known to be on observables only, asymptotic distribution theory can be standard. Consequently, there is a discontinuity in the limiting distribution theory for an estimator despite it being uniformly consistent. This discontinuity prevents standard inference procedures from being uniformly valid, and motivates the development of new methods, for which we establish asymptotic properties. It is then illustrated how the new inference procedure can be useful in other nonlinear models with endogenous variables.

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