Modelling Simultaneously Determined Discrete Outcomes with Application to Firm Entry and Product Quality Choice

Andrew Chesher (UCL) and Adam Rosen (Duke)

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Abstract

Structures admitted by models of processes in which discrete variables are simultaneously determined can deliver multiple, unique or no solutions depending on the values of parameters and realizations of unobserved and observed exogenous variables. Methods introduced in Chesher and Rosen (2017) are employed to characterize identified sets of structures and structural features in such models. A model of simultaneous firm entry and product choice studied in Mazzeo (2002) (M02) is considered. Confidence regions on projections of identified sets of parameters are presented, calculated using the M02 data and simulated data.

We have to deal with the implications of a feature of the data, namely that the outcome in which no firms enter a market is not observed in the M02 data. A similar situation arises in incoherent models. The result is dependence between unobserved and observed exogenous variables which presents challenges. We study methods to conduct identification analysis in this situation absent usually arbitrary parametric restrictions on the distribution of unobserved variables - restrictions which are commonly imposed in practice. We study the problem of characterizing a projection of identified sets of the parameters of structural relationships, θ, and the distribution of unobservables onto the space of θ alone when there is no parametric restriction on the distribution of unobservables.

This is a report on recent work done during the revision of Chesher and Rosen (2012). That paper sets the background for the presentation and introduces the basic framework for the identification analysis but the emphasis of the new work is very different.

References

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Mazzeo, M., (2002): "Product choice and oligopoly market structure," *The RAND Journal of Economics*, 33(2), 221-242.