PSC 585: Dynamic Models – Structure, Computation, & Estimation

Fall 2019
TR 1:30pm-3:00pm
Harkness 112

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By combining formal theory and statistical inference, structural models enable social scientists to conduct rich analyses of how institutions and public policy shape individual or

SCHEDULE

Reading List: Below is a preliminary list of topics and readings for the course. Topic 0 covers background methodological debates, which students are encouraged to study ahead of time. We will cover the first four topics in detail as they showcase most of the key ideas and techniques underpinning the applications.

0. The Causal Versus Structural Debate

- Heckman, J. J. (2000). Causal Parameters and Policy Analysis in Economics: A Twentieth Century Retrospective. *Quarterly Journal of Economics*, 115(1):45–97
- Deaton, A. (2010). Instruments, Randomization, and Learning about Development. *Journal of Economic Literature*, 48:424–455
- Heckman, J. J. and Urzúa, S. (2010). Comparing IV with structural models: What simple IV can and cannot identify. *Journal of Econometrics*, 156:27–37
- Imbens, G. W. (2010). Better LATE Than Nothing: Some Comments on Deaton (2009) and Heckman and Urzua (2009). *Journal of Economic Literature*, 48:399–423
- Angrist, J. D. and Pischke, J.-S. (2010). The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics. *Journal of Economic Perspectives*, 24(2):3–30
- Nevo, A. and Whinston, M. D. (2010). Taking the Dogma out of Econometrics: Structural Modeling and Credible Inference. *Journal of Economic Perspectives*, 24(2):69–82

- Gandhi, A. and Houde, J.-F. (2016). Measuring Substitution Patterns in Di□erentiated Products Industries. Working Paper

2. Discrete Games, Partial Identification

- Ciliberto, F. and Tamer, E. (2009). Market Structure and Multiple Equilibria in Airline Markets. *Econometrica*, 77(6):1791–1828
- Chernozhukov, V., Hong, H., and Tamer, E. (2007). Estimation and Confidence Regions for Parameter Sets in Econometric Models. *Econometrica*, 75(5):1243–1284
- Bajari, P., Hong, H., and Ryan, S. P. (2010). Identification and Estimation of a Discrete Game of Complete Information. *Econometrica*, 78(5):1529–1568
- Romano, J. P. and Shaikh, A. M. (2010). Inference for the Identified Set in Partially Identified Econometric Models. *Econometrica*, 78(1):169–211
- Andrews, D. W. K. and Shi, X. (2013). "Inference Based on Conditional Moment Inequalities". *Econometrica*, 81(2):609–666
- Pakes, A., Porter, J., Ho, K., and Ishii, J. (2015). Moment Inequalities and Their Application. *Econometrica*, 83(1):315–334
- Shi, X. and Shum, M. (2015). Simple two-stage inference for a class of partially identified models. *Econometric Theory*, 31(3):493–520
- Jia, P. (2008). What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retailing Industry. *Econometrica*, 76(6):1263–1316
- Canay, I. A. and Shaikh, A. (2017). Practical and theoretical advances for inference in partially identified models. In B. Honoré, A. Pakes, M. P. and Samuelson, L., editors, *Advances in Economics and Econometrics*, volume 2 of *Econometric Society Monographs*, pages 271–306. Cambridge University Press
- Andrews, D. W. K. and Soares, G. (2010). Inference for parameters defined by moment inequalities using generalized moment selection. *Econometrica*, 78(1):119–157
- Romano, J. P., Shaikh, A., and Wolf, M. (2014). A practical two-step method for testing moment inequalities. *Econometrica*, 82(5):1979–2002
- McKelvey, R. and Palfrey, T. (1995). Quantal response equilibria for normal-form games. *Games and Economic Behavior*, 10(1):6–38

3. Dynamic Programming

- Rust, J. (1987). Optimal replacement of gmc bus engines - an empirical model of harold zurcher. *Econometrica*, 55(5):999–1033
- Rust, J. (1988). Maximum-likelihood estimation of discrete control processes. *SIAM Journal on Control and Optimization*, 26(5):1006–1024

- Aguirregabiria, V. (2010). Another Look at the Identification of Dynamic Discrete Decision Processes: An Application to Retirement Behavior. *Journal of Business & Economic Statistics*, 28(2):201–218
- Aguirregabiria, V. and Mira, P. (2002). Swapping the nested fixed point algorithm: A class of estimators for discrete Markov decision models. *Econometrica*, 70(4):1519–1543
- Aguirregabiria, V. and Mira, P. (2010). Dynamic discrete choice structural models: A survey. *Journal of Econometrics*, 156(1):38–67
- Arcidiacono, P. and Miller, R. (2011). Conditional choice probability estimation of dynamic discrete choice models with unobserved heterogeneity. *Econometrica*, 79(6):1823–1867
- Hotz, V. and Miller, R. (1993). Conditional choice probabilities and the estimation of dynamic models. *Review of Economic Studies*, 60(3):497–529
- Hotz, V., Miller, R., Sanders, S., and Smith, J. (1994). A simulation estimator for dynamic modles of dsicrete choice. *Review of Economic Studies*, 61(2):265–289
- Hu, Y. and Shum, M. (2012). Nonparametric Identification of Dynamic Models with Unobserved State Variables. *Journal of Econometrics*, 171:32–44
- Imai, S., Jain, N., and Ching, A. (2009). Bayesian Estimation of Dynamic Discrete Choice Models. *Econometrica*, 77(6):1865–1899
- Kasahara, H. and Shimotsu, K. (2008). Pseudo-likelihood estimation and bootstrap inference for structural discrete Markov decision models. *Journal of Econometrics*, 146(1):92–106
- Kasahara, H. and Shimotsu, K. (2009). Nonparametric Identification of Finite Mixture Models of Dynamic Discrete Choices. *Econometrica*, 77(1):135–175
- Magnac, T. and Thesmar, D. (2002). Identifying dynamic discrete decisi8(v)-e

- Bajari, P., Benkard, C. L., and Levin, J. (2007). Estimating dynamic models of imperfect competition. *Econometrica*, 75(5):1331–1370
- Haile, P. A., Hortacsu, A., and Kosenok, G. (2008). On the empirical content of quantal response equilibrium. *American Economic Review*, 98(1):180–200
- Hu, Y. and Shum, M. (2013). Identifying Dynamic Games with Serially-Correlated Unobservables. In *Advances in Econometrics (Volume 31): Structural Econometric Models*. Emerald Publishing
- Jovanovic, B. (1989). Observable implications of models with multiple equilibria. *Econometrica*, 57(6):1431–1437
- Pakes, A., Ostrovsky, M., and Berry, S. (2007). Simple estimators for the parameters of discrete dynamic games (with entry/exit examples). *RAND Journal of Economics*, 38(2):373–399
- Pesendorfer, M. and Schmidt-Dengler, P. (2010). Sequential Estimation of Dynamic Discrete Games: A Comment. *Econometrica*, 78(2):833–842
- Reiss, P. (1996). Empirical models of discrete strategic choices. *American Economic Review*, 86(2):421–426
- Jia Barwick, P. and Pathak, P. (2015). The costs of free entry: an empirical study of real estate agents in Greater Boston. *RAND Journal of Economics*, 46(1):103–145

5. Applications

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