PSC 587/PEC 582: Structural Modeling and Estimation

Room: Harkness 112
Days and Time: TR, 13:30-15:00

Instructors: Tasos Kalandrakis and Sergio Montero
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Office Hours: R 15:30-16:30pm (Kalandrakis) and T 16:00-17:00pm (Montero)
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Course Description: Structural models enable social scientists to conduct rich analyses of how institutions and public policy shape individual or collective decision-making. The structural approach to empirical research is particularly useful in settings where more traditional methods cannot be applied, such as when agents behave strategically or when we wish to predict the consequences of never-before-observed policy interventions. This course covers the fundamentals of structural modeling and estimation. Depending on student interest, applications from political science, economics, and marketing will be considered, but emphasis will be placed on the methodology with the aim of helping students expand their research toolkit.

Prerequisites: Students are expected to have taken PSC 404, 405, 407, and 408, or equivalent graduate courses in another department. While PSC 584 is not required, students unfamiliar with games of incomplete information should be prepared to learn the material on their own if necessary for any of the readings. This course complements PSC 585 with a focus on "static" models.

Computing: Structural models rarely admit estimation using canned routines in popular statistical software (e.g., SPSS, Stata). Familiarity with a programming language (e.g.,

Matlab, Python, R) is therefore indispensable for structural estimation. Students should be prepared to acquire the necessary programming skills for the course.

Grading:

- Class participation
- Assignments during the course of the semester
- Presentation of a paper from the reading list
- Presentation of a research proposal (20 minutes), accompanied by a written paper outline (due on 12/13)

Reading List: Below is a preliminary list of topics and readings for the course. We will cover the first four topics in detail as they showcase most of the key ideas and techniques underpinning the rest of the material. We may skip other topics/readings or add new ones in accordance with student interest and time constraints. (Examples of additional topics we could cover include auctions, matching, and networks, as well as applications in finance/marketing. Dynamic models will be covered next year in PSC 585.)

1. 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

- Rust, J. (2010). Comments on: "Structural vs. atheoretic approaches to econometrics" by Michael Keane. *Journal of Econometrics*, 156:21–24

2. Aggregate Discrete-Choice Models

- Berry, S. T. (1994). Estimating Discrete-Choice Models of Product Differentiation. *RAND Journal of Economics*, 25(2):242–262

- Berry, S., Levinsohn, J., and Pakes, A. (1995). Automobile Prices in Market Equilibrium. *Econometrica*, 63(4):841–890

- Nevo, A. (2000). A Practitioner's Guide to Estimation of Random-Coefficients Logit Models of Demand. *Journal of Economics & Management Strategy*, 9(4):513–548

- Dubé, J.-P., Fox, J. T., and Su, C.-L. (2012). Improving the Numerical Performance of Static and Dynamic Aggregate Discrete Choice Random Coefficients Demand Estimation. *Econometrica*, 80(5):2231–2267

- Judd, K. L. and Skrainka, B. S. (2011). High Performance Quadrature Rules: How Numerical Integration Affects a Popular Model of Product Differentiation. CEMMAP Working Paper CWP03/11

- Reynaert, M. and Verboven, F. (2014). Improving the performance of random coefficients demand models: The role of optimal instruments. *Journal of Econometrics*, 179:83–98

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

3. Discrete Games, Partial Identification, Monotone Comparative Statics

- 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
- Beresteanu, A., Molchanov, I., and Molinari, F. (2011). Sharp Identification Regions in Models with Convex Moment Predictions. *Econometrica*, 79(6):1785–1821
- 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
- Milgrom, P. and Shannon, C. (1994). Monotone Comparative Statics. *Econometrica*, 62(1):157–180
- Athey, S. (2001). Single Crossing Properties and the Existence of Pure Strategy Equilibria in Games of Incomplete Information. *Econometrica*, 69(4):861–889
- Athey, S. (2002). Monotone Comparative Statics Under Uncertainty. *Quarterly Journal of Economics*, 117(1):187–223
- Echenique, F. (2007). Finding All Equilibria in Games of Strategic Complements. *Journal of Economic Theory*, 135(1):514–532

4. Voting and Roll-Call Data

- Poole, K. and Rosenthal, H. (1985). A spatial model for legislative roll call analysis. *American Journal of Political Science*, 29:357–384
- Lahda, K. K. (1991). A spatial model of legislative voting with perceptual error. *Public Choice*, 68:151–174
- Poole, K. T. and Rosenthal, H. (1997). *Congress: A political-economic history of roll call voting*. Oxford University Press, New York
- Heckman, J. and Snyder, J. (1997). Linear probability models of the demand for attributes with an empirical application to estimating the preferences of legislators. *RAND Journal of Economics*, 28:S142–S189

- Poole, K. T. (2000). Nonparametric unfolding of binary choice data. *Political Analysis*, 8(3):211–237
- Londregan, J. (2000). Estimating legislators' preferred points. *Political Analysis*, 8:35–56
- Bailey, M. (2001). Ideal point estimation with a small number of votes: A random-effects approach. *Political Analysis*, 9(3):192–210
- Clinton, J. and Meirowitz, A. (2001). Agenda constrained legislator ideal points and the spatial voting model. *Political Analysis*, 9:242–259
- Martin, A. and Quinn, K. (2002). Dynamic ideal point estimation via markov chain monte carlo for the u.s. supreme court, 1953-1999. *Political Analysis*, 10:134–153
- Clinton, J., Jackman, S., and Rivers, D. (2004). The statistical analysis of roll call data. *American Political Science Review*, 98:355–370
- Bogomolnaia, A. and Laslier, J.-F. (2007). Euclidean preferences. *Journal of Mathematical Economics*, 43:87–98
- Kalandrakis, T. (2010). Rationalizable voting. *Theoretical Economics*, 5(1):93–125

5. Elections and the Media

- Strömberg, D. (2008). How the Electoral College Influences Campaigns and Policy: The Probability of Being Florida. *American Economic Review*, 98(3):769–807
- Kawai, K. and Watanabe, Y. (2013). Inferring Strategic Voting. *American Economic Review*, 103(2):624–662
- Martin, G. J. (2014). The Informational Content of Campaign Advertising. Working Paper
- García-Jimeno, C. and Yildirim, P. (2015). Matching Pennies on the Campaign Trail: An Empirical Study of Senate Elections and Media Coverage. Working Paper
- Kawai, K., Toyama, Y., and Watanabe, Y. (2015). Voter Turnout and Preference Aggregation. Working Paper
- Montero, S. (2016). Going It Alone? An Empirical Study of Coalition Formation in Elections. Working Paper
- Martin, G. J. and Yurukoglu, A. (2017). Bias in Cable News: Persuasion and Polarization. *American Economic Review*, 107(9):2565–2599

6. Lobbying and Congress

- Kang, K. (2016). Policy Influence and Private Returns from Lobbying in the Energy Sector. *Review of Economic Studies*, 83(1):269–305
- Canen, N., Trebbi, F., and Jackson, M. O. (2017). Endogenous Networks and Legislative Activity. Working Paper

7. Deliberation in Committees and Judicial Politics

- Iaryczower, M. and Shum, M. (2012). The Value of Information in the Court: Get it Right, Keep it Tight. *American Economic Review*, 102(1):202–237
- Iaryczower, M. and Shum, M. (2013). Money in Judicial Politics: Individual Contributions and Collective Decisions. Working Paper
- Iaryczower, M., Shi, X., and Shum, M. (2016). Can Words Get in the Way? The Effect of Deliberation in Collective Decision-Making? *Journal of Political Economy*, Forthcoming
- López-Moctezuma, G. (2016). Sequential Deliberation in Collective Decision-Making: The Case of the FOMC. Working Paper
- Silveira, B. S. (2017). Bargaining with Asymmetric Information: An Empirical Study of Plea Negotiations. *Econometrica*, 85(2):419–452

8. Political Economy of Development

- Buera, F. J., Monge-Naranjo, A., and Primiceri, G. E. (2011). Learning the Wealth of Nations. *Econometrica*, 79(1):1–45
- Weese, E. (2015). Political mergers as coalition formation: An analysis of the *Heisei* municipal amalgamations. *Quantitative Economics*, 6:257–307
- Acemoglu, D., García-Jimeno, C., and Robinson, J. A. (2015). State Capacity and Economic Development: A Network Approach. *American Economic Review*, 105(8):2364–2409
- Abramson, S. F. and Montero, S. (2018). Learning about Growth and Democracy. Working Paper