Description & Objectives: Spatial interdependence is ubiquitous across the social sciences. The likelihood and outcomes of demonstrations, riots, coups, and revolutions in one country almost certainly depend in substantively crucial ways on such occurrences in other countries (e.g., through demonstration effects or snowballing). Election outcomes and candidate qualities or strategies in some contests surely depend on those in others, and representatives’ votes in legislatures certainly depend on others’ votes or expected votes. In micro-behavioral research, long-standing and recently surging interest in contextual or network effects often refers to effects on each individual’s behavior or opinion from sets of other individuals’ opinions or behaviors; e.g., a respondent’s opinion on some policy likely depends on the opinions of her state, district, community, or social group. In international relations, states’ entry decisions in wars, alliances, and organizations, e.g., heavily depend on how many and who else enters and how. In comparative and international political economy, globalization, i.e., international economic integration, implies strategic (and non-strategic) interdependence in national-level macroeconomic policymaking. This course introduces spatial and spatiotemporal econometric models for continuous and limited dependent variables that can address such interdependence, with an emphasis on social-science applications.

The main objective of this course is to teach students how to incorporate the interdependence implied by most social scientific theories into their empirical analysis. Students will learn inter alia how to 1) diagnose spatial patterns in their data, 2) estimate the structural parameters of spatial and spatiotemporal regression models, 3) calculate and present spatial and spatiotemporal effects, 4) use spatial modeling to discriminate between the multiple sources of spatial correlation—common exposure, interdependence, and selection—and, when it exists, to evaluate the nature of the interdependence (e.g., strategic free-riding behavior, learning, coercion) among units of observation.

Daily Schedule: Our morning sessions will start around 9:30am (after continental breakfast courtesy of ICPSR, enrollments permitting). We will break for lunch around 11:30am, resuming with our afternoon session around 1pm. We will take a 15-30 minute break around 3:00pm (also with catered refreshments, enrollments permitting), and resume for lab 3:30-5:00.

Prerequisites: Students should have a basic understanding of matrix algebra, probability theory, first-year calculus, and regression as well as some familiarity with a software package that can be used for spatial analysis (e.g., Stata, R, or MatLab).

Course Materials: We do not use a textbook, but Anselin (2006) and Franzese & Hays (2008) overview most topics covered. Ward & Gleditsch (2008) provides good introductory textbook overview; LeSage & Pace (2009) is a good fuller, and more intermediate to advanced textbook.

Course Outline with Readings and Lab Plans

Session 1 (Monday, August 15th, Morning):
Introductory Stuff, Theoretical and Empirical Models of “Spatial” Interdependence


Session 2 (Monday, August 15th, Afternoon):
Diagnosing Spatial Association in Raw Data and/or in OLS Residuals


********** Lab Exercises: Measures & Diagnostics**********

Session 3 (Tuesday, August 16th, Morning):
Spatial Lag, Error, and Mixed Models I: A Typology of Structural Models


Session 4 (Tuesday, August 16th, Afternoon):
Spatial Lag, Error, and Mixed Models II: Estimation


**********Lab Exercises: SAR & STAR Models**********

Session 5 (Wednesday, August 17th, Morning):
Spatial Lag, Error, and Mixed Models III: Calculating and Presenting Spatial Effects


Session 6 (Wednesday, August 17th, Afternoon):
Spatiotemporal Models: Estimation & Interpretation


**********Lab Exercises: More SAR & STAR Models**********

Session 7 (Thursday, August 18th, Morning):
Limited Dependent Variables I: Spatial-Probit Model


**********Lab Exercises: Spatial Probit**********
Session 8 (Thursday, August 18th, Afternoon):
Limited Dependent Variables II: Spatial-Duration and Spatial-Count Models


********** Lab Exercises: Spatial-Duration & Count **********

Session 9 (Friday, August 19th, Morning):
Multiparametric Spatial-Lag Models and Network-Behavior Coevolution


********** Lab Exercises: m-STAR Model **********

Session 10 (Friday, August 19th, Afternoon):
Network and Spatial-Econometric Models of Network-Behavior Coevolution

Spatial-Econometric Models for the Political & Social Sciences
A Subject-Organized Reference List for Applied Spatial-Modeling in Political Science:


ON DIFFUSION IN COMPARATIVE & INTERNATIONAL POLITICAL ECONOMY, AND GLOBALIZATION: Simmons & Elkins 2004 and Simmons et al. 2006, e.g., stress cross-national diffusion as the main force behind recent economic liberalizations, as do Eising 2002; Brune et al. 2004; Brooks 2005, 2007; Jordan & Levi-Faur 2005; Way 2005; Lazer 2006; Prakash & Potoski 2006; Brune & Guisinger 2007; and many others. Empirical work on globalization-induced interdependencies are far too numerous even to cite. Just a list of recent works emphasizing those that recognize explicitly that interdependence implies effects of some units outcomes on others—and still a small subset at that—would include Genschel 2002; Guler et al. 2002; Franzese & Hays 2003, 2004b, 2005a, 2005abc, 2008c; Badinger et al. 2004; Basinger & Hallerberg 2004; Heichel et al. 2005; Henisz et al. 2005; Holzinger & Knill 2005; Knill 2005; Polillo & Guillén 2005; Elkins et al. 2006; Jahn 2006; Lee & Strang 2006; Manger 2006; Swank 2006; Baturo & Grey 2007; Cao 2007; Cao et al. 2007; Coughlin et al. 2007; Garretsen & Peeters 2007; Mosley & Uno 2007; Mukherjee & Singer 2007.

ON INTERDEPENDENCE OF LEGISLATORS’ VOTES (MODELED SPATIALLY): See, for example, Lacombe
& Shaughnessy 2005.


ON INTERDEPENDENCE OF CANDIDATE QUALITIES, CONTRIBUTIONS, OR STRATEGIES: See, for example, Goldenberg et al. 1986; Mizruchi 1989; Krasno et al. 1994; Cho 2003; Gimpel et al. 2006.

FOR SPATIAL MODELS OF THE INTERDEPENDENCE OF THE PROBABILITIES AND OUTCOMES OF COUPS: e.g., Li & Thompson 1975; OR RIOTS: e.g., Govea & West 1981; OR CIVIL WARS: e.g., Murdoch & Sandler 2004, Buhaug & Rød 2006; OR REVOLUTIONS: e.g., Brinks & Coppendge 2006.

ON INTERDEPENDENCE IN TREATY SIGNING: see, e.g., Murdoch et al. 2003.

ON INTERDEPENDENCE IN TERRORIST ORIGINS AND TARGETS: see, e.g., Brathwaite & Li 2008.


ON INTERDEPENDENCE IN MACROECONOMIC PERFORMANCE: see, e.g., Fingleton 2003; Novo 2003; Kosfeld & Lauridsen 2004; Maza & Villaverde 2004; Kelejian et al. 2006; Mencken et al. 2006.

ON INTERDEPENDENCE IN TECHNOLOGY, MARKETING, AND OTHER FIRM STRATEGIES: see, e.g.; Abramson & Rosenkopf 1993; Geroski 2000; Strang & Macy 2001; Holloway 2002; Bradlow 2005; Autant-Berard 2006; Mizruchi et al. 2006.

ON INTERDEPENDENCE IN FERTILITY, BIRTHWEIGHT, CHILD DEVELOPMENT, OR CHILD POVERTY: see, e.g., Tohnay 1995, Montgomery & Casterline 1996; Morenoff 2003; Sampson et al. 1999; Voss et al. 2006.

CITED REFERENCES


Holmes, T.J. 2006. “Geographic Spillover of Unionism.” Federal Reserve Bank of Minneapolis Research Department Staff Report 368.


Keohane, R., ed. 1996. Internationalization and Domestic Politics. Cambridge: Cambridge UP.


identity in Taiwan: Spatial regression with disjoint neighborhoods,” *Political Research Quarterly* 59:35–46.


Mears, D.P., Bhati, A.S. 2006. “No Community Is An Island: The Effects of Resource Deprivation...


