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SPATIAL ECONOMETRICS

This course explores spatial econometric models, which sit at the intersection of spatial analysis and econometrics. Spatial econometric models are appropriate for data where the units are not independent, but instead exhibit some type of spatial autocorrelation. These types of models are particularly useful for geographic data where the data from the geographic units are spatially dependent in some way. The effects may arise from externalities, interaction, or spatial concentration.

The course will begin with a discussion of why one might consider using these particular models and how they differ from other statistical approaches. Prior to this course, you should have already studied the linear regression model with some depth. We will examine what types of data are amenable to these spatial econometric approaches and what assumptions underlie the various methods.

The reading material will be dense. You will need to read carefully and slowly. The first reading will be a review piece that surveys the literature and provides a large picture of the field. Once we establish this background, we will then move on to applications of spatial econometric methods. I expect you to read the applications very carefully with close attention to detail, especially the methodological details. Carefully look over the table entries and the text describing the analysis presented. Please allot sufficient time to read each piece carefully. I cannot emphasize enough that *none* of the readings in this course should be skimmed.

We will end with a software session where I will demonstrate how to use various software packages for spatial analysis. In particular, we will explore GeoDA, which is a free software package that provides spatial data analysis tools, geovisualization tools, as well as a spate of tools for analyzing spatial autocorrelation and conducting spatial modeling. We will also examine qGIS, a free and open-source cross-platform desktop geographic information system (GIS) application that supports the viewing, editing, and analysis of geospatial data. ArcGIS is a similar tool, but is not free or open source. Your knowledge of qGIS will translate almost seamlessly to skill with ArcGIS. Lastly, we will examine several R packages that support the analysis of spatial data. We will cover the spdep package and may examine other packages as well, as time allows.

REQUIRED TEXTS AND SOFTWARE:

The readings will be provided electronically. Please complete the readings before class and be prepared to discuss them. We will have a lead discussant for each article, but you should expect to participate in the discussion every week whether or not you are the designated lead discussant. My teaching relies heavily on class interaction. I have found that lecturing is far less effective for learning than a style that incorporates greater interaction and engagement from the class.

For the software session, please bring laptops with the required software already installed. In particular, please install R (available at `http://www.r-project.org`), Geoda (`https://geodacenter.asu.edu/software/downloads`), and qGIS (`http://hub.qgis.org/projects/quantum-gis/wiki/Download`). You can also preload the R library, `spdep`.

COURSE REQUIREMENTS:

Each week, you will write a short paper about the week's reading. The paper should be a critique one of the articles in the week's reading. These papers should read like a referee report that you might write for a scholarly journal. It should highlight both the good points as well as discuss more questionable aspects of the research. These papers should be succinct and about a page or two long. *They should reflect critical thought and not be simply a summary of the reading.*

Classes will be discussion oriented. At the beginning of the course, we will set up a discussion schedule and each of you will lead multiple discussion sessions. We will have more than one leader for each session, and the leaders should expect to summarize the readings, highlight key points, critique, direct group conversation, and facilitate group discussion.

COURSE OUTLINE

WEEK 1.

Anselin, Luc. 2006. "Spatial Econometrics." In T.C. Mills and K. Patterson, eds., *Palgrave Handbook of Econometrics: Volume 1, Econometric Theory.* Basingstoke: Palgrave Macmillan, pp. 901–941.

WEEK 2.

Baller, Robert D., Luc Anselin, Steven F. Messner, Glenn Deane, Darnell F. Hawkins. 2001. "Structural Covariates of U.S. County Homicide Rates: Incorporating Spatial Effects." *Criminology* 39, 3: 561–590.

Baller, Robert D. and Kelly K. Richardson. 2002. "Social Integration, Imitation, and the Geographic Patterning of Suicide." *American Sociological Review* 67, 6 (December): 873–888.

Cho, Wendy K. Tam. 2003. "Contagion Effects and Ethnic Contribution Networks." *American Journal of Political Science* 47, 2 (April): 368–387.

WEEK 3.

Voss, Paul R., David D. Long, Roger B. Hammer, and Samantha Friedman. 2006. "County Child Poverty Rates in the US: A Spatial Regression Approach." *Population Research and Policy Review* 25, 4 (August): 369–391

O'Loughlin, John, Frank D. W. Witmer, Andrew M. Linke, and Nancy Thorwardson. 2010. "Peering into the Fog of War: The Geography of the WikiLeaks Afghanistan War Logs, 2004–2009. *Eurasian Geography and Economics* 51, 4: 472–495.

Souris, Marc, Jean-Paul Gonzalez, Jothiganesh Shanmugasundaram, Victoria Corvest, and Pattamaporn Kittayapong. 2010. "Retrospective Space-Time Analysis of H5N1 Avian Influenza Emergence in Thailand." *International Journal of Health Geographies* 9:3

WEEK 4.

Cho, Wendy K. Tam and Thomas J. Rudolph. 2007. "Emanating Political Participation: Untangling the Spatial Structure Behind Participation." *British Journal of Political Science* 37, 1 (April): 273–289.

Cho, Wendy K. Tam and Neil Baer. 2011. "Environmental Determinants of Racial Attitudes Redux: The Critical Decisions Related to Operationalizing Context." *American Politics Research* 39, 2 (March): 414–433.

Cho, Wendy K. Tam and James G. Gimpel. 2010. "Rough Terrain: Spatial Variation in Campaign Contributing and Volunteerism." *American Journal of Political Science* 54, 1 (January): 74–89.

WEEK 5.

Cranshaw, Justin, Raz Schwartz, Jason I. Hong, and Norman Sadeh. 2012. "The Livehoods Project: Utilizing Social Media to Understand the Dynamics of a City." Proceedings of the 6th International AAAI Conference on Weblogs and Social Media. Dublin, Ireland.

SOFTWARE SESSION (GEODA, QGIS)

WEEK 6. SOFTWARE SESSION (R SPDEP)