

## **Course is part of the research school: People, Society and Sustainability**

Department of Economics/Department of Urban and Rural Development

### **English Title:**

An introduction to Spatial Econometrics: Methods and Applications

### **Swedish Title:**

En introduktion till spatial ekonometrik: Metoder och tillämpninga

**Higher Education Credits:** 5 credit

**Subject:** Other Social Science

**Possible Additional Subjects:** Econometrics

**Course Type:** General course

**Language:** English

**Prerequisites:** Admittance to a PhD program.

**Start date:** 13 October, 2025

**In-person lectures:** 27 – 31 October, 2025. Room C391, Mötesrum Öjebyn

**Final registration date:** 10 October, 2025

### **Objective:**

At the end of the course, students are expected to be able to:

1. Quantify spatial dependence in empirical variables
2. Appreciate and interpret spatial aspects of economic relationships from geographic and nongeographic perspectives
3. Understand spatial econometric estimation methods
4. Explain the conditions for identification of spatial models
5. Use statistical/econometrics software to estimate models with spatial elements
6. Test and interpret estimated relationships that contain spatial elements

### **Content:**

This course provides an introduction to spatial econometrics. Spatial econometrics is concerned with the spatial aspects present in cross-sectional and space-time observations. "Space" is interpreted not merely in a geographic sense, but also in economic or sociological terms. The course is specifically designed for PhD students with a basic background in econometrics.

### **Assessment:**

Students will deliver a seminar presentation on their own research or replicate a provided study demonstrating the purpose and importance of spatial econometric techniques. The presentation should clearly explain the methodological steps taken, show how potential

sources of error were identified and addressed, and provide a well-structured interpretation of the results.

**Contact for application and further information:**

Shaibu Mellon Bedi, shaibu.mellon@slu.se

**Literature:**

Recommended books and supplementary materials:

Kelejian, H., & Piras, G. (2017). *Spatial econometrics*. Academic Press.

Elhorst, J. P. (2014). *Spatial econometrics: from cross-sectional data to spatial panels* (Vol. 479, p. 480). Heidelberg: Springer.

Kopczewska, K. (2020). *Applied spatial statistics and econometrics: data analysis in R*. Routledge.

L. Anselin (1988). *Spatial Econometrics: Methods and Models*. Dordrecht: Kluwer.

Bivand, Roger S., Pebesma, Edzer J., Gómez-Rubio, Virgilio (2008), *Applied Spatial Data Analysis with R*, Springer.

Angrist, J.D., and A.B. Krueger. 1991. "Does compulsory school attendance affect schooling and earnings?" *The Quarterly journal of economics* 106(4): 979–1014.

Anselin, L. and S. Ray. 2014. "Two stage least squares." In: *Modern Spatial Econometrics in Practice: A guide to GeoDa, GeoDaSpace, and PySAL*, pp. 139-142. GeoDa Press LLC.

Baum-Snow, N., M.E. Kahn & R. Voith. 2005. "Effects of urban rail transit expansions: Evidence from sixteen cities, 1970-2000." *Brookings-Wharton Papers on Urban Affairs*, 147-206.

LeSage, J.P., and Christine Thomas-Agnan. 2015. "interpreting spatial econometric origin-destination flow models." *Journal of regional science* 55, no. 2: 188–208.

Lukongo, O. E., & T. Miller. 2018. "Evaluating the spatial consequence of interest rate ceiling using a spatial regime change approach." *The American Economist*, 63(2), 166-186.

Proost, S., & J. F. Thisse. 2019. "What can be learned from spatial economics?" *Journal of Economic Literature*, 57(3), 575-643.

Schneider, P., & Mellon-Bedi, S. (2025). The Environmental Kuznets Curve Revisited: A Spatial Panel Model with Heterogeneous Coefficients. *Energy Economics*, 143, 108237.

Skevas, T., Skevas, I., & Swinton, S. M. (2018). Does spatial dependence affect the intention to make land available for bioenergy crops?. *Journal of Agricultural Economics*, 69(2), 393-412.

Skevas, I. (2020). Inference in the spatial autoregressive efficiency model with an application to Dutch dairy farms. *European Journal of Operational Research*, 283(1), 356-364.

**Additional Information:**

The primary software applications used in this course will be R, which is “free and open source software”. Stata may be used sparingly in the course.

**27-31 October, 2025 (in person lectures); Room C391, Mötesrum Öjebyn**

<b>Day</b>	<b>Morning session (09:00 am)</b>	<b>Afternoon session (16:00 pm)</b>
<b>Monday</b>	Introduction to spatial econometrics	Conceptual framework of spatial statistics
<b>Tuesdays</b>	<ul style="list-style-type: none"> <li>• Neighbourhood structure and spatial weight matrix,</li> <li>• Spatial autocorrelation, &amp; spatial statistics vs spatial econometrics</li> </ul>	Practical applications in spatial econometric models
<b>Wednesday</b>	<ul style="list-style-type: none"> <li>• Motivation of regression for spatial econometrics model</li> <li>• Spatial autoregressive model (SAR), Spatial lag models (SLM);</li> <li>• and Spatial error models (SEM)</li> </ul>	Practical applications in spatial econometric models
<b>Thursday</b>	<ul style="list-style-type: none"> <li>• Spatial panel models</li> <li>• Dealing spatial dependency and spatial heterogeneity</li> </ul>	Spatiotemporal models and critiques of spatial econometrics
<b>Friday</b>	Practical applications of spatial econometric models and summative discussion	Project presentations, group work

Note: Data will be provided for use during the practical session.