

## Syllabus

# Geospatial Analysis for Development Economics

(Räumliche Analyse in der Entwicklungsökonomik)

Master seminar

Summer term 2023

(as of March 21, 2023)

**Prof. Dr. Andre Groeger**

Universitat Autònoma de Barcelona

Email: [andre.groeger@gmail.com](mailto:andre.groeger@gmail.com)

Website: <https://sites.google.com/site/andregroeger/>

Office hours: by appointment

## 1. General information

### *1.1 Course content*

Spatial data is becoming ever more widely available, for example in the form of georeferenced internet traffic, satellite imagery, or through the digitalization of historical maps. Exploiting such data has become a key skill for empirical researchers in economics and beyond. This course seeks to introduce the wide range of different spatial data sources available, to deliver the practical skills required for using this data, and to showcase applications in which those can be used for economic research. With respect to the applications, we will cover the fields of development, labor, and urban economics as well as political economy and will pay particular attention to quasi-experimental approaches for causal inference.

### *1.2 Course goals*

The objectives of this course are threefold: First, we will review selected pieces of economic research that use geospatial data to obtain an understanding of the relevance of

this approach across different fields of economics. Second, through continuous hands-on exercises using GIS software, we will learn the necessary skills to replicate these approaches and harness the benefits of spatial data. Third, by the end of the course students are expected to identify an interesting research question involving some form of spatial data and to conduct an empirical investigation of a research question of their choice in the form of a term paper.

### *1.3 Prerequisites*

Students should be familiar with mathematical statistics and basic econometrics. Knowledge of intermediate econometrics with focus on quasi-experimental methods and development economics is helpful. We will be using the free software QGIS throughout the class. Prior knowledge of the program is not necessary. Downstream data analysis can be conducted in any statistical program of choice.

### *1.4 Credit points*

6 ECTS-LP

### *1.5 Registration*

Please register via FlexNow until April 19<sup>th</sup> 2023. The number of participants is restricted to 20.

## **2. Course overview**

### *2.1 Description of the teaching and learning methods*

The seminar is a blocked class during summer 2023 with an online and an on-campus part. The course language is English.

### *2.2 Meetings*

**Info Meeting (ONLINE): April 12, 14-15h.**

Zoom [link](#)

## **PART I (ONLINE)**

- 1. Introduction [August 21, 10-13h]**
  - a. Types of geospatial data
  - b. Spatial objects
  - c. Spatial reference and projection
- 2. GIS for Economists [August 23, 10-13h]**
  - a. Program choice and language
  - b. Visualization of geospatial data
  - c. Data manipulation
- 3. GIS: Basic tools [August 25, 10-13h]**
  - a. Overlay/collapse
  - b. Buffer/distance
  - c. Elevation/least cost paths

## **PART II (IN PERSON)**

- 4. Statistical inference I: Spatial regression discontinuity design [05 September 2023, 15-18h, for room see EXA]**
  - a. Approach and assumptions
  - b. Examples
  - c. Replication exercise
- 5. Statistical inference II: Spatial propagation [06 September 2023, 9-12h, for room see EXA]**
  - a. Approach and assumptions
  - b. Examples
  - c. Replication exercise
- 6. Statistical inference III: Climate Change [07 September 2023, 9-12h, for room see EXA]**
  - a. Approaches and assumptions
  - b. Examples
  - c. Replication exercise
- 7. Topics in Spatial Economics [08 September 2023, 9-12h, for room see EXA]**
  - a. Combining survey and weather data
  - b. Cluster-robust inference
  - c. Data management

### *2.3 Examination and grading of the module*

This course will be graded according to the German numeric system. Each grade has two components:

- Short take-home exam (50%), handout: August 25, 13:00h; due: August 28, 08:59h
- Short term paper, max. 10 pages (50%), due: September 17, 23:59h

### *2.4 Course materials*

Alesina, A., Giuliano, P. and Nunn, N.: 2013, On the origins of gender roles: Women and the plough, *The Quarterly Journal of Economics* 128(2), 469–530.

Baskaran, T., Min, B. and Uppal, Y.: 2015, Election cycles and electricity provision: Evidence from a quasi-experiment with Indian special elections, *Journal of Public Economics* 126, 64–73.

Becker, S. O. and Woessmann, L.: 2009, Was weber wrong? a human capital theory of protestant economic history, *The Quarterly Journal of Economics* 124(2), 531–596.

Black, S. E.: 1999, Do better schools matter? parental valuation of elementary education, *The Quarterly Journal of Economics* 114(2), 577–599.

Brodeur, A., Lekfuangfu, W. N. and Zylberberg, Y.: 2017, War, migration and the origins of the Thai sex industry, *Journal of the European Economic Association* 16(5), 1540–1576.

Burgess, R., Hansen, M., Olken, B. A., Potapov, P. and Sieber, S.: 2012, The political economy of deforestation in the tropics, *The Quarterly Journal of Economics* 127(4), 1707–1754.

Chen, X. and Nordhaus, W. D.: 2011, Using luminosity data as a proxy for economic statistics, *Proceedings of the National Academy of Sciences* 108(21), 8589–8594.

Dell, M.: 2015, Trafficking networks and the Mexican drug war, *The American Economic Review* 105(6), 1738–1779.

Dell, M.: 2010, The persistent effects of Peru's mining mita, *Econometrica* 78(6), 1863–1903.

Dinkelman, T.: 2011, The effects of rural electrification on employment: New evidence from south africa, *The American Economic Review* 101(7), 3078–3108.

Dittmar, J. E.: 2011, Information technology and economic change: the impact of the printing press, *The Quarterly Journal of Economics* 126(3), 1133–1172.

- Donaldson, D.: 2018, Railroads of the raj: Estimating the impact of transportation infrastructure, *The American Economic Review* 108(4-5).
- Gonzalez, R. M.: 2016, Social monitoring and electoral fraud: Evidence from a spatial regression discontinuity design in Afghanistan, Technical report.
- Gröger, A. and Zylberberg, Y.: 2016, Internal labor migration as a shock coping strategy: Evidence from a typhoon, *American Economic Journal: Applied Economics* 8(2), 123–153.
- Heblich, S., Trew, A. and Yanos, Z.: 2021, East side story: Historical pollution and persistent neighborhood sorting, *Journal of Political Economy* 129(5).
- Henderson, J. V., Storeygard, A. and Weil, D. N.: 2012, Measuring economic growth from outer space, *The American Economic Review* 102(2), 994–1028.
- Hodler, R. and Raschky, P.: 2014, Regional favoritism, *The Quarterly Journal of Economics* 129(2), 995–1033.
- Hornbeck, R. and Keniston, D.: 2014, Creative destruction: Barriers to urban growth and the great Boston fire of 1872, Technical report, National Bureau of Economic Research.
- Imbens, G. and Zajonc, T.: 2011, Regression discontinuity design with multiple forcing variables, Report, Harvard University.[972] .
- Keele, L., Titiunik, R. and Zubizarreta, J. R.: 2015, Enhancing a geographic regression discontinuity design through matching to estimate the effect of ballot initiatives on voter turnout, *Journal of the Royal Statistical Society: Series A* 178(1), 223–239.
- Kudamatsu, Masayuki, GIS for Credible Identification Strategies in Economics Research, *CESifo Economic Studies* 64(2), 327–338.
- Lipscomb, M., Mobarak, M. A. and Barham, T.: 2013, Development effects of electrification: Evidence from the topographic placement of hydropower plants in Brazil, *American Economic Journal: Applied Economics* 5(2), 200–231.
- Mayshar, J., Moav, O., Neeman, Z. and Pascali, L.: 2016, Cereals, appropriability and hierarchy.
- Michalopoulos, S.: 2012, The origins of ethnolinguistic diversity, *The American economic review* 102(4), 1508–1539.
- Michalopoulos, S. and Papaioannou, E.: 2013, Pre-colonial ethnic institutions and contemporary African development, *Econometrica* 81(1), 113–152.
- Michalopoulos, S. and Papaioannou, E.: 2014, National institutions and subnational development in Africa, *The Quarterly Journal of Economics* 129(1), 151–213.

- Miguel, E. and Kremer, M.: 2004, Worms: identifying impacts on education and health in the presence of treatment externalities, *Econometrica* 72(1), 159–217.
- Muehlenbachs, L., Spiller, E. and Timmins, C.: 2015, The housing market impacts of shale gas development, *The American Economic Review* 105(12), 3633–3659.
- Nunn, N.: 2008, The long-term effects of Africa’s slave trades, *The Quarterly Journal of Economics* 123(1), 139–176.
- Olken, B. A.: 2009, Do television and radio destroy social capital? evidence from Indonesian villages, *American Economic Journal: Applied Economics* 1(4), 1–33.
- Pascali, L.: 2017, The wind of change: Maritime technology, trade and economic development, *American Economic Review* 107(9), 2821-54.
- Qian, N.: 2008, Missing women and the price of tea in China: The effect of sex-specific earnings on sex imbalance, *The Quarterly Journal of Economics* 123(3), 1251–85.
- Skovron, C. and Titiunik, R.: 2015, A practical guide to regression discontinuity designs in political science.
- Wuepper, D. and Finger, R.: 2023, Regression discontinuity designs in agricultural and environmental economics, *European Review of Agricultural Economics*, 50(1), 1–28.
- Yanagizawa-Drott, D.: 2014, Propaganda and conflict: Evidence from the Rwandan genocide, *The Quarterly Journal of Economics* 129(4), 1947–1994.