



Seminar Winter Term 2024/25

Seminar on Economic Progress

“Geospatial Data in Economics – Causal Inference and Implementation”

Content

Geospatial data is becoming increasingly available, for example in form of satellite images, digitized historic maps, gridded climate data, or georeferenced surveys. Exploiting such geographical variation provides new possibilities for deriving causal inference in economics. Nowadays, many research articles exploit some sort of geospatial data, whether through the inclusion of geographic control variables, geographic instruments, or directly as dependent or explanatory variables. Hence, exploiting geospatial data is becoming a highly relevant skill.

Course Goals

The aim of the seminar is threefold. First, we will review applications of geospatial data in economic research and become familiar how causal inference can be derived from quasi-experimental empirical approaches, such as *spatial difference-in-differences*, *spatial regression discontinuity design* and *instrumental variables*. We will learn about different types of geospatial data and data sources. Second, we will develop practical skills for working with geospatial data using Geographical Information Systems (QGIS), by replicating parts of the discussed research articles. Third, students are expected to prepare an academic poster about a research article of their choice, incorporating some sort of geospatial data and replication, using the skills that they have developed in the practical sessions.

Target Group

Students should be familiar with regression analysis and have a good understanding of how to read and interpret econometric results. Prior knowledge in QGIS (or similar software like ArcGIS/GeoDa) is not necessary. The seminar will be held in English. The course is **mainly addressed to master students**, but advanced bachelor students are also allowed to participate. However, in case of overbooking, master students are given priority.

Students can earn credit points for the following degree programs:

- Internationale Wirtschaft und Entwicklung (B.A.): Seminar on Development
- Economics (B.Sc.): Seminar on Development
- Philosophy and Economics (B.A.): Seminar on Development
- Internationale Wirtschaft und Governance (M.A.): Individual Focus or Specialization „Governance & Public Management“
- Economics (M.Sc.): Individual Focus
- Philosophy and Economics (M.A.): Electives
- Development Studies (M.A.): D3 (“Topics in Economics and Governance”) or E1 (“Individual Deepening or Catching Up”).
- History and Economics (M.A.): Specialization “Economics”
- Business Administration (M.Sc.): Supplementary Module

Registration

To apply for the seminar (first-come-first-served basis), please fill out the following form, including your three prioritized research articles by **Friday, 11.10.2024**.

Google Forms Registration

The seminar is limited to **15 participants**.

Seminar Organization

Date	Content
17.10.2024 8:30-12:00 S60/CIP	Introductory meeting <ul style="list-style-type: none"> • Why and where do we need geospatial data in economics? • Organization of the seminar
24.10.2024 8:30-12:00 S60/CIP	Introduction to geospatial data and QGIS <ul style="list-style-type: none"> • Types of geospatial data • Projection systems • Introduction to QGIS • Loading and visualization of spatial data <p>Reading: Donaldson, Dave, and Adam Storeygard. 2016. "The View from Above: Applications of Satellite Data in Economics." <i>Journal of Economic Perspectives</i> 30 (4): 171-198.</p>
31.10.2024 8:30-12:00 S60/CIP	Replication 1 – Alsan (2015) <ul style="list-style-type: none"> • Raster calculations • Centroids • Spatial joins <p>Reading: Alsan, Marcella. 2015. "The effect of the TseTse fly on African development." <i>American Economic Review</i> 105 (1): 382-410.</p>
07.11.2024 8:30-12:00 S60/CIP	Replication 2 – Chung and Rhee (2022) <ul style="list-style-type: none"> • (Spatial) difference-in-differences • Buffer zones and distance calculation • Afrobarometer and natural disasters data <p>Reading: Chung, Eunbin, and Inbok Rhee. 2022. „Disasters and intergroup peace in sub-Saharan Africa." <i>Journal of Peace Research</i> 59 (1): 58-72.</p>
14.11.2024 8:30-12:00 S60/CIP	Replication 3 – Michalopolous and Papaioannou (2014) <ul style="list-style-type: none"> • (Spatial) regression discontinuity designs • Nightlights data <p>Reading: Michalopolous, Stelios, and Elias Papaioannou. 2014. "National Institutions and Subnational Development in Africa." <i>The Quarterly Journal of Economics</i> 129 (1): 151-213.</p>
21.11.2024 8:30-12:00 S60/CIP	Replication 4 – Dinkelman (2011) <ul style="list-style-type: none"> • Instrumental variable strategy • Calculating slope gradients • Topography data <p>Reading: Dinkelman, Taryn. 2011. "The Effects of Rural Electrification on Employment: New Evidence from South Africa." <i>American Economic Review</i> 101 (7): 3078-3108.</p>
28.11.2024 8:30-12:00 S60/CIP	How to create maps and posters <ul style="list-style-type: none"> • Creating maps in QGIS • What makes a good academic poster?
<i>December</i>	<i>Individual meetings (mandatory), students work on their posters.</i>
16.01.2025	First deadline for posters (students will receive feedback and have time for adjustments.)
23.01.2025	Final submission of posters (if submitted in time, I will print one copy for each student. Whoever misses the deadline is responsible for bringing a printed poster to the poster presentation.)
30.01.2025 8:30-12:00 S59	Poster presentations

Requirements

The course work consists of three parts: (1) a portfolio, (2) a poster, and (3) a poster pitch.

- 1) **Portfolio:** We will have four replication exercises in QGIS in the first weeks of the semester. The exercises are based on a research article, which we will discuss in class. We will then step-by-step replicate parts of the paper. Your portfolio should include a short summary of each discussed paper, especially focusing on the used data, geographical variation and empirical approach (~ 1 page). Your portfolio should also include the (digital) QGIS project files and all created tables and maps as indicated in the exercise sheets. Portfolio files should be submitted one week after the respective lecture.

- 2) **Poster:** You are expected to design an academic poster about a research article of choice. Your research article will use some geographical variation or empirical strategy in line with the methods that we will discuss in our first meetings. Your poster should summarize the motivation, research question, data, empirical strategy and results of the paper in a compact and visually nice (!) way. In addition, your poster should include *at least one map or table* that you *replicate on your own* in QGIS. This can be a pure replication, or, it may also extend the maps included in the article. It is mandatory, to arrange at least one meeting with me to discuss your ideas for the poster.

- 3) **Poster pitch:** At the end of the lecture period, we will have a poster session, where you will give a 5-minute pitch about your poster. Afterwards there will be time for discussions and questions.

The final grade is defined by the portfolio (1/4), poster (1/2) and poster pitch (1/4).

Outline of Topics and Literature

1. Cagé, Julia, and Valeria Rueda. 2016. “The long-term Effects of the Printing Press in Sub-Saharan Africa.” *American Economic Journal: Applied Economics* 8 (3): 69–99.
2. Michalopoulos, Stelios, and Elias Papaioannou. 2016. “The Long-Run Effects of the Scramble for Africa.” *American Economic Review* 106 (7): 1802–48.
3. Berman, Nicolas, Mathieu Couttenier, Domenic Rhoner, and Mathias Thoenig. 2017. “This Mine is Mine! How Minerals Fuel Conflicts in Africa.” *American Economic Review* 107 (6): 1564–1610.
4. Rohner, Dominic, Mathias Thoenig, and Fabrizio Zilibotti. 2013. “Seeds of distrust: conflict in Uganda.” *Journal of Economic Growth* 18: 217–252.
5. Flückiger, Matthias, and Markus Ludwig. 2022. “Temperature and risk of diarrhoea among children in Sub-Saharan Africa.” *World Development* 160: 106070.
6. Bleakley, Hoyt, and Jeffrey Lin. 2012. “Portage and Path Dependence.” *The Quarterly Journal of Economics* 127 (2): 587–644.
7. Harari, Mariaflavia, and La Ferrara, Eliana. 2018. “Conflict, Climate, and Cells: A Disaggregated Analysis.” *The Review of Economics and Statistics* 100 (4): 594–608.
8. Balk, Deborah, Thomas Pullum, Adam Storeygard, Fern Greenwell, Melissa Neuman. 2004. “A spatial analysis of childhood mortality in West Africa.” *Population, Space and Plan* 10: 175–216.
9. Cherniwchan, J. and Moreno-Cruz, J. (2019). “Maize and precolonial Africa”. *Journal of Development Economics* 136: 137–150.
10. Hjort, Jonas, and Jonas Poulsen. 2019. “The Arrival of Fast Internet and Employment in Africa.” *American Economic Review* 109 (3): 1032–1079.
11. Rotondi, Valentina, and Michele Rocca. 2022. “Bombs and Babies. Exposure to Terrorism and Fertility Choices in Nigeria.” *Journal of African Economies* 31 (5): 487–510.
12. Lucas, Adrienne M. 2010. “Malaria Eradication and Educational Attainment: Evidence from Paraguay and Sri Lanka”. *American Economic Journal: Applied Economics* 2 (2): 46–71.
13. Storeygard, Adam. 2016. “Farther on down the Road: Transport Costs, Trade and Urban Growth in Sub-Saharan Africa.” *The Review of Economic Studies* 83 (3): 1263–1295.
14. Dell, Melissa. 2010. “The Persistent Effects of Peru’s Mining Mita.” *Econometrica* 78 (6): 1863–1903.
15. Gonzalez, Robert M. 2021. “Cell Phone Access and Election Fraud: Evidence from a Spatial Regression Discontinuity Design in Afghanistan.” *American Economic Journal: Applied Economics* 13 (2): 1–51.

16. Burgess, Robin, Francisco Costa, and Benjamin A. Olken. 2023. "National Borders and the Conservation of Nature." *Unpublished paper*.
17. Duflo, Esther, and Rohini Pande. 2007. "Dams." *The Quarterly Journal of Economics* 122 (2): 601–646.
18. Nunn, Nathan, and Leonard Wantchekon. 2011. "The Slave Trade and the Origins of Mistrust in Africa." *American Economic Review* 101 (7): 3221–52.