

Econ. 895 Spatial Techniques in Empirical Economics
George Mason University, Fall 2017
Th 4:30 pm - 7:10 pm, Room: Innovation 316

Instructor: Noel D. Johnson

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Office Location: Carow 8

Office Hours: Tuesdays 2:00-3:00 or by appointment

Course Webpage: http://noeldjohnson.net/noeldjohnson.net/Spatial_Econ.html

Course Description

This Course serves as an introduction to the use of spatial data in applied economic settings. Those taking the course will learn how to use ArcGIS to create and analyze spatial data. We will also read a selection of articles which use spatial data from the Urban, Growth, Trade, Economic History, and Development fields. The ultimate goal of the course is get students going on empirical research projects that will contribute to their dissertations and eventually be published.

Week 1	Introduction
Week 2	Geographic Variables and D-in-D
Week 3	Distance and IV's
Week 4	Regression Discontinuity
Week 5	Climate Data and Using Grids
Week 6	Lights at Night
Week 7	Cities, Growth, and Geo-referencing Data
Week 8	The Urban Network
Week 9	Network Access and Market Access
Week 10	Student Research Paper Presentations

Week 11 Student Research Paper Presentations

Week 12 Student Research Paper Presentations

Course Requirements

Eighty percent of success is showing up – Woody Allen

- Research paper worth 60% of your final grade.
- Research paper presentation worth 30% of your final grade.
- Attending class and participating in discussions is worth 10% of your final grade.

A Note on the Paper

The paper should attempt to test a specific hypothesis using one or more of the empirical tools we discuss in class. The final work should be about 15-20 pages in length, double-spaced in Times Roman 12 pt. font.

I am requiring you to write the paper in L^AT_EX. This is the standard among most researchers in economics today and you might as well learn it now rather than later. Here is a source to get you started:

<http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/>

Here is another one...

<https://www.tug.org/begin.html>

And one more...

https://www.researchgate.net/publication/280050294_Template-based_introduutory_guide_to_LaTeX_for_Economics_Instructional_Guide_Version_2

A Note on Presentations

Thirty percent of your course grade is determined by your paper presentation.

I encourage the use of slides for your presentation, but try not to over-do it. If you have questions on what is over-doing it, please refer to this book:

Tufte, E. (1983). *The visual display of quantitative information*. Graphics Press

I will grade your presentations on ‘content’ (how well you have framed and answered your research question) and ‘style’ (how well you present the material).

Since you’re writing the paper in L^AT_EX, you should probably also make your presentation slides using the L^AT_EX presentation environment known as Beamer. Here are some sample slides:

<https://www.dropbox.com/sh/hnccpxpzmqjn55d/AACvkPZ25DxR5hhGrURXR91Ea?dl=0>

Recommended Texts

There are no required texts for this class that must be purchased. Most of the readings can be downloaded from either JSTOR, the NBER Working Papers archive, EconLit, or the course webpage. You are required to acquire these papers and read them before the week they are listed on the syllabus.

Most of the articles require knowledge of econometric techniques. I will attempt to explain the methods used when they come up, however, you may wish to have a more detailed treatment of the methods at your disposal. Two excellent sources for the basics (plus some more advanced material) are:

Peter Kennedy, *A Guide to Econometrics*, (Wiley-Blackwell: 2008).

Joshua Angrist and Jorn-Steffen Pischke, *Mastering Metrics: The Path from Cause to Effect*. (Princeton University Press, 2014).

If you plan on using stata to do some econometrics and you want a thorough conceptual guide to that, check out Shapiro's and Gentzkow's guide to 'Code and Data' which I have placed in the folder of downloadable readings on the course webpage.

A good place to get advice on how to write a paper is, McCloskey, D. (2000). *Economical Writing*. Waveland Press, Incorporated

Or, you could take a look at the material on my webpage here: http://noeldjohnson.net/noeldjohnson.net/Advice_on_Writing.html

I also highly recommend this book:

William Thomson, *A Guide for the Young Economist*. (MIT Press: 2011).

Some Useful Resources

- General Advice on Research (these are contained in the readings folder)
 - Weil Peptalk.pdf (EVERYBODY SHOULD READ THIS!!!)
 - Cochrane Writing Tips PhD Students
 - Harvard Sophomore Writing Economics
 - Shapiro Gentzkow CodeAndData.pdf
- L^AT_EX
 - <http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/>
 - <https://www.tug.org/begin.html>
 - https://www.researchgate.net/publication/280050294_Template-based_introduutory_guide_to_LaTeX_for_Economics_Instructional_Guide_Version_2
 - <http://www.latextemplates.com/>

- ArcGIS
 - Dell GIS Easy Notes (readings folder)
 - <http://www.fao.org/nr/gaez/newsevents/detail/en/c/141573/>
- Stata
 - <http://data.princeton.edu/stata/>
 - <http://repec.org/bocode/e/estout/esttab.html>
- R
 - <http://tryr.codeschool.com/levels/1/challenges/1>
 - intro-spatial-rl (readings folder)
 - GDistance Description R (readings folder)
 - <https://cran.r-project.org/web/packages/gdistance/gdistance.pdf>
 - <http://www.maths.lancs.ac.uk/~rowlings/Teaching/UseR2012/cheatsheet.html>
 - <https://www.nceas.ucsb.edu/~frazier/RSpatialGuides/OverviewCoordinateReferenceSystems.pdf>
 - <https://pakillo.github.io/R-GIS-tutorial/#plot>
 - <http://mazamascience.com/WorkingWithData/?p=1277>

Some Important Dates

First Day of Classes: 8/28

Labor Day Recess: 9/4

Columbus Day Recess: 10/9 (Tuesday classes don't meet that week)

Thanksgiving Recess: 11/22 – 11/26

Last Day of Classes: 12/9

PLEASE NOTE: COURSE POLICIES

1. George Mason University Honor System and Code

Honor Code

George Mason University has an Honor Code, which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are all prohibited.

All violations of the Honor Code will be reported to the Honor Committee.

Plagiarism (statements from Mason Web Site)

Plagiarism means using the exact words, opinions, or factual information from another person without giving that person credit.

<http://mason.gmu.edu/montecin/plagiarism.htm#plagiarism>

Please familiarize yourself with the Honor System and Code, as stated in the George Mason University Undergraduate Catalog. When you are given an assignment as an individual, the work must be your own. Some of your work may be collaborative; source material for group projects and work of individual group members must be carefully documented for individual contributions.

<http://mason.gmu.edu/montecin/plagiarism.htm>

2. Class Registration

Students are responsible for verifying the accuracy of their own schedules. Students need to check PatriotWeb regularly to verify that they are registered for the classes that they think they are. This is particularly important since students are no longer dropped for nonpayment. Faculty may not allow a student who is not registered to continue to attend class and may not grade the work of students who do not appear on the official class roster.

Deadlines each semester are published in the Schedule of Classes available from the Registrar's Web Site registrar.gmu.edu

After the last day to drop a class, withdrawing from this class requires the approval of the dean and is only allowed for nonacademic reasons. Undergraduate students may choose to exercise a selective withdrawal. See the Schedule of Classes for selective withdrawal procedures.

3. Accommodations for students with disabilities:

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703-993-2474. All academic accommodations must be arranged through that office.

The need for accommodations should be identified at the beginning of the semester and the specific accommodation has to be arranged through the Office of Disability Resources. Faculty cannot provide accommodations to students on their own (e.g. allowing a student extra time to complete an exam because the student reports having a disability).

Course Outline

Week 1: Introduction

- Introduction
- (1) David Weil's Peptalk (in Readings Folder)
- (2) Dell's Technical Notes (in Readings Folder)
- Getting ArcGIS, Stata, R, L^AT_EX, and BibTeX on your machine
- Coordinate Systems (see Dell notes sect. 1.4)
- Vector and Raster data (see Dell notes sect. 1.2)
- Application: Week 1

Week 2: Geographic Variables and D-in-D

- (3) Nunn, N. and Qian, N. (2011). The potato's contribution to population and urbanization: Evidence from a historical experiment. *The Quarterly Journal of Economics*, 126(2):593–650
- Difference-in-Differences
- Layers and the Spatial Join
- Application: Week 2

Week 3: Distance and IV's

- (4) Dittmar, J. E. (2011b). Information technology and economic change: the impact of the printing press. *The Quarterly Journal of Economics*, 126(3):1133–1172
- Instrumental Variables
- Measuring Distances (Near)
- Application: Week 3

Week 4: Regression Discontinuity Design

- (5) Dell, M. (2010). The persistent effects of peru's mining mita. *Econometrica*, 78(6):1863–1903
- RD
- Buffers etc. . .
- Application: Week 4

Week 5: Climate Data and Using Grids

- (6) Iyigun, M., Nunn, N., and Qian, N. (2015). Agricultural productivity, conflict, and state size: evidence from potatoes, 1400-1900. Technical report, Working paper
- Making Grids
- Using Climate data
- Application: Week 5

Week 6: Lights at Night

- (7) Michalopoulos, S. and Papaioannou, E. (2013). Pre-colonial ethnic institutions and contemporary african development. *Econometrica*, 81(1):113–152
- (8) Matt Lowe's 'Night Lights and ArcGIS: A Brief Guide' (in Readings Folder)

Week 7: Cities, Growth, and Geo-referencing Data

- (9) Duranton, G. and Puga, D. (2013). The growth of cities
- (10) Dittmar, J. (2011a). Cities, markets, and growth: The emergence of zipf's law. *Institute for Advanced Study*
- Geo-referencing Maps and Geocoding Large Data Sets
- Application: Week 7

Week 8: The Urban Network

- (11) Davis, D. R. and Weinstein, D. E. (2002). Bones, Bombs, and Break Points: The Geography of Economic Activity. *American Economic Review*, 92(5):1269–1289
- Spatially Interpolating Data
- Application: Week 8

Week 9: Network Access and Market Access

- (12) Johnson, N. D. and Koyama, M. (2017). Jewish communities and city growth in preindustrial europe. *Journal of Development Economics*, 127:339–354
- Market Potential and Network Potential
- Application: Week 9

Week 10: Student Paper Presentations

Week 11: Student Paper Presentations

Week 12: Student Paper Presentations

References

- Davis, D. R. and Weinstein, D. E. (2002). Bones, Bombs, and Break Points: The Geography of Economic Activity. *American Economic Review*, 92(5):1269–1289.
- Dell, M. (2010). The persistent effects of peru’s mining mita. *Econometrica*, 78(6):1863–1903.
- Dittmar, J. (2011a). Cities, markets, and growth: The emergence of zipf’s law. *Institute for Advanced Study*.
- Dittmar, J. E. (2011b). Information technology and economic change: the impact of the printing press. *The Quarterly Journal of Economics*, 126(3):1133–1172.
- Duranton, G. and Puga, D. (2013). The growth of cities.
- Iyigun, M., Nunn, N., and Qian, N. (2015). Agricultural productivity, conflict, and state size: evidence from potatoes, 1400-1900. Technical report, Working paper.
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- McCloskey, D. (2000). *Economical Writing*. Waveland Press, Incorporated.
- Michalopoulos, S. and Papaioannou, E. (2013). Pre-colonial ethnic institutions and contemporary african development. *Econometrica*, 81(1):113–152.
- Nunn, N. and Qian, N. (2011). The potato’s contribution to population and urbanization: Evidence from a historical experiment. *The Quarterly Journal of Economics*, 126(2):593–650.
- Tufte, E. (1983). *The visual display of quantitative information*. Graphics Press.