

## Econ 631: Econometrics research seminar

### Course info

Instructor:

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318 Odom

OH: By appointment, in person or on Zoom

Time: TBD

Place: TBD

URL: <http://blackboard.olemiss.edu>

### Overview

This is a survey course in advanced econometric methods. What makes the methods that we will study advanced is not that they are more difficult than the standard tools of linear econometrics (OLS and IV), but that they can be applied in settings where these standard tools fail. In fact, an important conclusion of the course will be that our usual tools are robust enough to be applied under a wide variety of circumstances, although there are settings where advanced methods are called for.

The explicit goal of this course is to prepare you to apply these methods in your research. Thus, although we will examine the theoretical motivation for, and properties of, the methods that we study, our focus will be on their application. Consequently, much of the work that you will do in this course will entail implementing the methods that we discuss and interpreting the results.

### Texts

The lectures will be based on notes that I will distribute. However, you should have access to either

- *Econometric Analysis of Cross-Section and Panel Data* by Wooldridge (2nd edition, MIT Press), or
- *Econometric Analysis* by Greene (7th or 8th edition, Pearson).

Both of these texts are excellent references. I personally prefer Wooldridge for a class at this level, but it is somewhat more technical, and Greene is a good all-around reference that most students already have a copy of. The appendices to Greene also provide a nice review of the background on probability, statistics, and other concepts necessary for this class, and can be accessed online for free.<sup>1</sup>

Some of the material in the lectures will be drawn from review articles listed below. For those that wish to delve deeper into the literature, I will also provide references to papers on specific topics in the notes. You may also find the following references helpful at some

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<sup>1</sup><http://pages.stern.nyu.edu/~wgreene/Text/Greene-EA-7&8ed-Appendices.pdf>.

point in your research career (although you are not required to purchase or read them for this class):

- *Microeconometrics: Methods and Applications* by Cameron and Trivedi (2005, Cambridge University Press) is a practitioner's reference for many topics in microeconometrics.
- *Econometrics* by Hansen (2022, Princeton University Press) is a comprehensive econometrics textbook that also covers the majority of the material that we will discuss (and in some cases provides details that Wooldridge and Greene omit), and much more.
- *Mostly Harmless Econometrics: An Empiricists Companion* by Angrist and Pischke (2009, Princeton University Press) is an excellent guide to using econometrics for causal inference.

## Software

The official software for this course will be Stata. StataCorp offers competitive pricing for six-month, one-year, and perpetual student licenses.<sup>2</sup> I will provide you with sample code to help you learn how to implement the tools that we learn in Stata. If you are interested in expanding your Stata programming skills, I recommend the following resources:

- German Rodriguez's Stata tutorial is a great place to get started with Stata programming.<sup>3</sup>
- Christopher Baum's article "A little bit of Stata programming goes a long way" introduces a number of the useful Stata programming techniques.<sup>4</sup>
- Baum's *An Introduction to Stata Programming* (2nd edition, Stata Press) is a comprehensive guide to Stata programming.

The methods that we will learn can also be implemented in other statistical packages, such as R. Although we will primarily use Stata in this class, I recommend developing familiarity with multiple statistical packages. I have posted some resources for learning R at <https://jrgcmu.github.io/resources.html>. I will also do my best to accommodate you if you are interested in using alternative software, although Stata will remain the official software for this class.

## Assessment

Your grade in this course will be based on your performance on several problem sets, worth a total of 50% of your grade, and two exams, each worth 25% of your grade.

## Course policies

*Attendance.* Attendance is mandatory. It's also a good way to learn the material.

*Accommodations.* If you require any accommodations (such as extra time, a different testing environment, etc.), please let me know as soon as possible. For more information on the University's policies regarding such accommodations, see <http://sds.olemiss.edu>.

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<sup>2</sup>See <https://www.stata.com/order/new/edu/gradplans/student-pricing/>.

<sup>3</sup><https://data.princeton.edu/stata/>.

<sup>4</sup><http://fmwww.bc.edu/ec-p/wp612.pdf>.

*Collaboration and plagiarism.* All of the work that you submit for this course must be your own; any violation of this standard constitutes plagiarism. Any student found plagiarizing once will fail the assignment or exam; any student found twice will fail the course.

## **Outline and readings**

### 1. *Clustering*

Wooldridge, sec. 20.3

Greene, sec. 4.5 and 11.3

Cameron and Miller. 2015. "A Practitioner's Guide to Cluster-Robust Inference." *Journal of Human Resources*, 50: 317-372.

### 2. *Panel data*

Wooldridge, ch. 10 and 11

Greene, ch. 11

### 3. *Binary and discrete choice*

Wooldridge, ch. 16 and 17

Greene, ch. 17 and 18

### 4. *Count data*

Wooldridge, ch. 18

Greene, sec. 18.4

### 5. *Truncation and censoring*

Wooldridge, ch. 17 and 19

Greene, ch. 19

Chay and Powell. "Semiparametric Censored Regression Models." *Journal of Economic Perspectives*, 15 (4): 29-42.

### 6. *Sample selection*

Wooldridge, ch. 19

Greene, ch. 19

### 7. *Treatment effects*

Wooldridge, ch. 21

Greene, sec. 8.5

Imbens. 2004. "Nonparametric Estimation of Average Treatment Effects under Exogeneity: A Review." *Review of Economics and Statistics*, 86 (1): 4-29.

Imbens and Wooldridge. 2009. "Recent Developments in the Econometrics of Program Evaluation." *Journal of Economic Literature*, 47 (1): 5-86.

**Tentative schedule**

TBD