Econometrics: Multiple Equation Estimation **ARE212: Section Syllabus**

Professor	Max Auffhammer	**Office hours**	Wednesdays, 5:00PM-6:00PM
GSI	Patrick Baylis		or by appointment
Section time	Friday, 9:00AM-10:00AM	**OH location**	234 Giannini
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The objective of section is to introduce you to `R` as a tool for econometric analysis. Each section, we will work through a coded example that uses actual econometric data in order to illustrate the use of `R` and some of the concepts that Max will cover in lecture. These are intended to be interactive so I strongly encourage you to bring your laptops to section and to interrupt me with questions and comments.

Before we get into any of the details, I (and you) owe a great deal of thanks to **Dan Hammer**, a third-year colleague of ours in ARE who originally wrote these notes for last year's class[1]. Dan and I are collaborating to produce a comprehensive set of `R`-based section notes that span ARE212 and ARE213 (which many of you will take in the fall) and it would be helpful if you would let me know about any mistakes that you find in the notes.

The following outline of section topics follows the lecture notes as they have been presented in the past. This outline will very likely change, but the section notes will be posted in advance on bSpace. The work in progress on the notes will also be posted to my GitHub repository[2].

January 31	Introduction to R
February 7	Matrix operations in R
February 14	Ordinary least squares
February 21	Goodness of fit
February 28	Hypothesis testing
March 7	Data problems
March 14	Coding check-in
March 21	Generalized least squares and ggplot
April 4	Maximum likelihood
April 11	Large sample properties
April 18	Heteroskedasticity and serial correlation
April 25	Instrumental variables
May 2	Returns to education (example)
May 9	Spatial analysis OR web scraping

[1] Dan's original notes are available at www.github.com/danhammer/ARE212. You will find them to be both excellent and somewhat more technically advanced than what I present in section. I highly recommend them, in particular for students who find the pace of my sections to be slow.

[2] www.github.com/pbaylis/ARE212

E-mail policy: You are welcome to e-mail me questions about the course, section, or problem sets. However, if I can't answer your question in less than a paragraph, I will ask you to come to office hours or to make an appointment with me so that we can discuss it in person. If that isn't possible, you will have to come up with a shorter question. Brevity is the soul of econometrics.

Feedback: As a first-year GSI, I will find your candid feedback on the content, pace, and presentation of section immensely valuable. You can let me know in person, via e-mail, or anonymously if you prefer. I have set up a form for anonymous feedback here: `https://www.get3sixty.com/:kcvz34` or you may simply leave a note in my mailbox in Giannini.

Laptops: As I mentioned above, I would be delighted if you brought your laptops to section in order to follow along with the examples I present. I do understand that having a computer open breeds certain temptations. I can't promise that I will be more interesting than Facebook, but I do think you'll learn more about econometrics from me. Unless you have a bunch of econometricians on your Feed.

Homework: See Max's syllabus for details on problem sets and their grading. I will only add a gentle plea for you to carefully comment your code. In the short term, commenting is a useful way to force you to think about what your code is doing as you write it. In the medium term, it will allow you to look over your code one or two months later (e.g. when you are working on your midterm) and understand what you did quickly. In the long term, clear and well-commented code is a valuable habit that will serve you throughout your career. And finally, though it hardly bears mentioning, it will make my grading life easier and improve my general disposition towards your problem sets.

Attendance: Attendance at section is not required. I hope the sections are helpful, but I don't expect that they will be useful for everyone. Only come if they are helpful to you, or if my jokes are just that good.

Additional resources: There are many resources available to learn `R` and basic econometrics available on the web. There are even some that do both together. I've included a few of my favorites below:

1. `R` reference card: `http://cran.r-project.org/doc/contrib/refcard.pdf`
2. Various starter resources for `R`: `http://www.ats.ucla.edu/stat/r/`
3. Search engine for `R`: `http://www.rseek.org`
4. Econometrics in `R`: `http://cran.r-project.org/doc/contrib/Farnsworth-EconometricsInR.pdf`
5. `R` if you already know `C++` or `Java` or `Perl` : `http://www.johndcook.com/R_language_for_programmers.html`

Special accomodations: If you should require any disability-related accommodations during our sections, lecture, or exams, please see me privately. You will ultimately need to procure an accommodations letter from the Disabled Students Program (dsp.berkeley.edu), which will be sent directly to Max.