Economics 562: Econometrics II   Chris Stoddard

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Course description:

This course is a continuation of the theoretical and applied econometrics material in 561 Econometrics I. Enrollment is restricted to students who have completed that course. The first part of the course covers the most common identification methods used by applied microeconomists, particularly panel data methods, instrumental variables, and regression discontinuity design. The second part of the course covers other econometric topics based on student interest. These typically include time series analysis, maximum likelihood estimation, and limited dependent variable models. The goal is for students to master this material theoretically (for example, proving properties of estimators with statistical theory) and in an applied context (programming estimation models, presenting findings graphically).   Student also develop an independent empirical research project using the tools covered in this course and present these projects at the end of the semester.

Learning Outcomes:

After successfully completing this course, students will
1. Be able to identify common issues in estimating causal relationships using non-experimental data.
2. Be able to compare and critique the most common identification methods used by applied economists both conceptually and using common test statistics.
3. Be able to implement these models using a student's chosen statistical package. Analyze and interpret results.
4. Develop other econometric tools, including maximum likelihood estimators and limited dependent variable models. Depending on student interests, this may also include time series estimation topics.
5. Conduct and present a substantive empirical research project using the tools developed in class.   For students in the master's program, this is often a start in your thesis.

Text: Wooldridge, Introductory Econometrics Older editions are fine. **This text is required.**

For Regression Discontinuity, we will use the chapter in Cunningham's Causal Inference: the MixTape. The text is freely available on https://mixtape.scunning.com/

This text also has Stata, R, and Python code

Complementary resources:

EASIER: I **strongly** encourage you to use at least one undergraduate text to help with intuition and the "big picture." Good choices: Pindyck and Rubinfeld, Economic Models and Economic Forecasts, Gujarati's Essential Econometrics or Basic Econometrics.

MORE ADVANCED: Greene, Econometric Analysis. Much more technical, covers additional topics including many you may encounter in your thesis. Many PhD programs use this text. There are also a number of more specialized advanced texts on panel data, time series, limited dependent variables, etc. See me as needed for these. A. Cameron and P. Trivedi, Microeconometrics is another great resource for many modern methods.

Angrist and Pischke's Mostly Harmless Econometrics is well written and covers several of the core econometric techniques we will be discussing. Depth more than breadth. Funnier than most texts. Highly recommended.

STATA:

Problem sets and answer keys will be provided using STATA, but you are welcome to use whatever package you prefer. R and SAS (and increasingly Python) are used most often in industry. STATA is used most often by academic applied economists. I am most proficient in Stata.

Baum, An Introduction to Modern Econometrics Using Stata is useful for figuring out how to organize your data, conduct tests, deal with functional form, instrumental variables, etc. Not a substitute for the Stata manuals, but a terrific bridge between the text and your project.

A. Cameron and P. Trivedi, Microeconometrics Using Stata. is more advanced and comprehensive. Useful for simulation, nonlinear models, more maximum likelihood estimators, learning to program your own estimators.

Cunningham's Causal Inference: the Mixtape also has Stata and R examples

Grading:

Project Presentation   15%   See attached assignment.

Paper Presentations   10%
    You present a paper of your choice that uses one of the econometric tools we will develop in class.   Presentations are "conference style" with a hard 15 minute time limit. Make sure to practice so you can get through it in exactly 15 minutes. You are welcome to use papers that you are reading for Dr. Gilpin's lit review assignment as long as they use the specified technique.

    Slides will likely include
    1. Question
    2. Data
    3. Main econometric issues the estimation needs to address (e.g., endogeneity, omitted variables, etc.)
    4. Key regression equations
    5. Tables of main results (ok to paste from paper **if it's readable**)
    6. Discussion of additional key robustness checks
    7. Your critique of strengths/weaknesses/remaining questions (MUST INCLUDE THIS)

Midterm   25%

Final   35%
                       No late exams.
                       If you feel that an exam question was not graded correctly, you must
                       submit a *written* justification of your claim within two class periods.
                       The *entire* exam will be reevaluated.

Homework   15%   (Problem sets and readings)
                       Problem sets are due in class on the date assigned. You may turn in 1
                       assignment up to *two weeks late*. Full credit for a serious attempt.
                       Answers will not be corrected—you are expected to check the keys.
                       You are welcome work with others, but turn in individual
                       assignments.

Course Outline—subject to change
Please use this as a rough guide to the coverage and ordering of chapters.

Tuesday	T	Th
Jan 16	x	Review
Jan 23	LM tests (Ch 5)	Ch 12 Serial Correlation **HMK 1 LM tests**
Jan 30	Ch 13 Simple Panel data	
Feb 6	Ch 14 Advanced Panel data	**HMK 2**
Feb 13		DiD advances
Feb 20	**Panel data presentations**	**HMK 3**
Feb 27	**MIDTERM**	Ch 15 IV estimation
Mar 5		**HMK 4**
	Spring Break	
Mar 19	**Topic and Data due** Ch 16 Simultaneous Equations	
Mar 26	Regression Discontinuity Design (Cunningham)	**HMK 5**
Apr 2	**IV/RD presentations**	
Apr 9	Ch 17 Limited Dependent variables +AppendixA, B Maximum Likelihood Estimation	
Apr 16		**HMK 6**
Apr 23	No class	No class **HMK 7 due**
April 30	**Project Presentations**	**Project Presentations**

FINAL exams will be coordinated across the graduate classes.