University of California, Merced **Spring 2018**

Introduction to Econometrics
ECON 110

Instructor

Professor Laura Giuliano

- Office: COB2 332
- Office hours: Tuesdays & Wednesdays @ 1:30-2:30 PM
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Teaching Assistant

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Meeting time & place

Lecture:

- Location: COB2 170
- Time: Tuesday/Thursday, 10:30 AM – 11:45 AM

Lab sections:

- Location: Both lab sections will meet in SSM 154
- Times:
  - Wednesday, 2:30PM – 3:20 PM
  - Wednesday, 3:30PM – 4:20 PM
- NOTE: the first meeting will take place on Wed., 1/24

Website

All lecture handouts, assignments and solutions, data sets, and answer keys to quizzes and exams will be posted on CatCourses. Announcements will also be posted there.

Course Description, Goals & Learning Objectives

This course introduces students to econometrics, a subfield of economics that applies statistical methods to economic data in order to measure economic quantities and relationships. The course studies methods for prediction, hypothesis testing, and causal inference and demonstrates how these methods are applied in economics. We will focus in particular on identification, estimation, and inference within the framework of linear regression analysis. Students will learn to conduct regression analysis using the statistical software Stata.

The goal is to provide students with the knowledge to begin conducting their own empirical research in economics, to evaluate economic/business policy, to perform forecasting, and to critically read the quantitative analysis of other researchers. Students will become comfortable using a statistical package to analyze data and estimate regression models; they will understand what assumptions are needed to interpret the output; they will become familiar with some of the most common issues that arise in regression analysis; and they will be able to interpret and explain the results.

Prerequisites

ECON 10 and MATH 11 or equivalent.

From ECON 10, you should be familiar with most, if not all, of the material in Appendices A ("Basic Mathematical Tools"), B ("Fundamentals of Probability"), and C ("Fundamentals of Mathematical Statistics") of the textbook.

We will spend some time reviewing this material and introducing the notation that will be used in this course. But if you are not comfortable with it, you will need to spend extra time reviewing it. A basic understanding of calculus is also very helpful for this course; however, you will not be required to calculate derivatives or do proofs.

Textbook

Wooldridge, J. (2016), Introductory Econometrics: A Modern Approach, 6th Edition, Cengage Learning.

You may also use the 4th or 5th edition—both are similar and cheaper (and may even be found online). We will follow the book fairly closely, with some changes in the ordering of the material. Many of the sample datasets and homework problems will be taken from the textbook; however, they will also be posted on the course website.

Software

You will be required to use **Stata**, a statistical package that is widely used by social scientists for analyzing data. Class examples will be illustrated using Stata, and you will be expected to use Stata for the empirical exercises on your problem sets. The University has site licenses for Stata version 12. You will use Stata 12 during the lab (section) and you may also access Stata 12 using the University's site license in *SSM 152* or during open hours at one of the other computer labs on campus (*KL 202, KL 208, SSM 102, SSM 154, and COB 281*).

You may also purchase the newest version of Stata, which is Stata 15. If you purchase Stata 15, the interface may look slightly different from what you'll see in the labs on campus, but you'll have the convenience of being able to work from your own computer. To purchase your own license using the student discount go to: http://www.stata.com/order/new/edu/gradplans/student-pricing/. The least expensive option is "**Stata/IC**" at **$45 /6 mos**. (More expensive options allow for larger data sets and faster processing speeds but Stata/IC is more than sufficient for this class.) You are ***not required*** to purchase Stata.

Lab sections

Discussion sections will be led by the TA, who will teach you how to use Stata, work through at least some of the problems and computer exercises on the problems sets, and will work through additional problems to help you prepare for the exams.

Graded problems sets and quizzes will be returned during the discussion sections.

Determination of Course Grade

- **Six** problem sets: **10%**
- **Six** short, in-class, open-note quizzes: **5%**
- **Two** in-class, closed-book exams: **20% each**
- Final data assignment: **20%**
- Final exam: **25%**

Problem sets—details & policies

- **Six problem sets** will be assigned. They will include a combination of worked problems and computational exercises involving data analysis with Stata. These assignments will be time consuming and they are crucial to learning the course material and to learning how to use Stata.
- **Problems sets policies:**
  - Some of the problems/computer exercises will be done during the lab and the TA will guide you through them. For problems not completed in lab, you are encouraged to discuss with classmates. You may also ask for guidance in office hours and consult the text, class notes, and/or Stata help files. *However*, to receive credit, you must work through each problem on your own, write and run the Stata code on your own, and write up your own set of answers. You must include all necessary computer output with your assignment (see the problem set instructions for details).
  - Hard copies of problem sets will be distributed in class and pdf versions will be posted on CatCourses. Please write your answers in the spaces provided to facilitate grading.
- Problem Sets are due in class *at the beginning of class* (due dates will be indicated on the problem set). ***Late assignments will receive zero credit***.
  - If you cannot make it to class, you must make sure that the professor or TA receives your problem set *before the deadline*.
  - Answer keys will be posted on CatCourses after the assignments have been collected. Your TA will grade the assignments and return them in discussion sections.
- **Grading.** Problem sets will be assigned credit based on *completeness* (and will *not* be graded for correctness) as follows:
  - ✓ (=2 points) complete (all questions attempted and work shown)
  - ✓**-** (=1 point) partially complete (including if you answer all questions but do not turn in Stata work)
  - **0** points if not attempted or not turned in on time
  - **10%** of your course grade will be determined by the formula: **min(10xTOT, 100)**, where TOT= total points earned on all 6 problem sets. Note that this formula builds in some flexibility so that you can miss one assignment *or* turn in two partially complete assignments without penalty.

Quizzes

- **Six quizzes** will be given in class at either the beginning or end of class. They will be *short* (~5-10 minutes), open-note (you may consult *your own* notes *only*), and will cover material from the most recent 3-5 lectures. Dates will *not* be announced in advance.
- Only the 5 best of the 6 quiz grades will be counted (so you can miss one without penalty).

Exam Schedule & Policies

- The dates of the exams are:

  Midterm #1: Tuesday, Feb. 20th

  Midterm #2: Thursday, April 5th

  Final exam: Saturday, May 5th, 3:00-4:30 PM

- Each midterm will take 1 hour, 15 minutes and will focus on the material from the most recent 9-10 lectures. Each midterm will count for **20%** of your grade.
- The final exam will be cumulative, but with a focus on the material from the last third of the course. It will take 1 hour and 30 minutes (slightly longer than the midterms). The final exam is worth **25%** of your grade.
- The exams will be closed notes and closed book. You will not need a calculator (nor will you be allowed to use one).
- Cell phones must be off and not visible during exams—any cell phone use during an exam will result in an automatic zero.
- If you miss an exam for any unapproved reason, your grade for that exam will be 0%.
- In case of a severe — and well-documented — emergency that causes you to miss one of the exams, I will place more weight on the other two exams or, depending on the circumstances, arrange for a makeup exam.

Final data assignment

- **A final assignment** will involve data analysis and interpretation and will require you to apply the skills you developed while doing the problem sets.
- You will complete this project ***independently*** and may not discuss it with your classmates. (Although all students will answer similar questions, you will be randomly assigned one of multiple possible data sets and you must work with the data set you are assigned.)
- This assignment will be due on or before **5 PM on Thursday, May 3rd** (the last day of class).
- It will be graded (for correctness) and will be worth **20%** of your course grade.

Students with disabilities

- Students with disabilities are encouraged to talk with me during the first two weeks of classes to discuss appropriate accommodations.
- Students are also encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

Tentative Course Outline*

#	Dates	Topics	Readings**
1	Tues., Jan. 16	Introduction/course overview	
2	Thurs., Jan. 18	Nature of econometrics & economic data	Ch. 1
3	Tues., Jan. 23	Review of probability (one variable)	Appendix B (B1,B3,B5)
4	Thurs., Jan. 25	Review of estimation & statistical inference (one variable)	Appendix C (C1-C4)
5	Tues., Jan. 30	Review of estimation & statistical inference, cont'd.	Appendix C (C5-C6)
6	Thurs., Feb. 1	Joint probability (2 variables) Begin simple linear regression	Appendix B (B2, B4); Ch. 2.1
7	Tues., Feb. 6	Simple linear regression model – definition & estimation	Ch. 2.2
8	Thurs., Feb. 8	Simple linear regression model cont'd; Goodness of fit; Units of measurement & functional form	Ch. 2.3, 2.4
9	Tues., Feb. 13	Simple linear regression – statistical properties of OLS	Ch. 2.5
10	Thurs. Feb. 15	Wrap up/review	
	Tues. Feb. 20	**MIDTERM #1 (on material from Lectures 1-10)**	
11	Thurs. Feb. 22	Multiple regression – motivation	Ch. 3.1
12	Tues. Feb. 27	Multiple regression – estimation & interpretation	Ch. 3.2
13	Thurs. Mar. 1	Multiple regression – OLS & omitted variables	Ch. 3.3
14	Tues. Mar. 6	Multiple regression – omitted variables, cont'd. Further issues: choosing regressors	Ch. 3.3, 6.3
15	Thurs. Mar. 8	Multiple regression – statistical properties	Ch. 3.4-3.5
16	Tues. Mar. 13	Multiple regression –statistical inference (small sample)	Ch. 4.1-4.4
17	Thurs. Mar. 15	Multiple regression – statistical inference, cont'd.	Ch. 4.1-4.4
18	Tues. Mar. 20	Multiple regression – inference, F-test Reporting regression results	Ch. 4.5, 4.6
19	Thurs. Mar. 22	OLS asymptotics (large sample inference)	Ch. 5.1-5.2
	Mar. 27 & 29	***SPRING BREAK***	
20	Tues. Apr. 3	Review class	Ch. 6.4
	Thurs. Apr. 5	**MIDTERM #2 (on material from Lectures 11-20)**	
21	Tues. Apr. 10	Further issues: prediction	Ch. 6.4
22	Thurs. Apr. 12	Further issues: binary (dummy) variables	Ch. 7.1-7.4, 7.6
23	Tues. Apr. 17	Further issues: binary (dummy) variables, cont'd.	
24	Thurs. Apr. 19	Further issues: interactions and polynomials	Ch. 6.2
25	Tues. Apr. 24	Further issues: heteroscedasticity	Ch. 8.1-8.3
26	Thurs. Apr. 26	Binary response variables (time permitting)	Ch. 7.5, 17.1
27	Tues. May 1	Wrap up	
28	Thurs. May 3	Review class; **FINAL DATA ASSIGNMENT DUE**	
Sat., May 5th @ 3:00-4:30 PM in COB2 107 -- FINAL EXAM			

* Schedule is subject to change; please check CatCourses for announcements and updates.

** All readings are in Wooldridge (2016). Lecture note power points and handouts will be distributed in class and also posted on CatCourses.