

Department of Economics  
University of Southern California



**Econ 318: Introduction to  
Econometrics**

Professor Jeffrey Weaver

Fall 2022

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Office Hours: KAP 306C OR <https://usc.zoom.us/j/583913703> (Meeting ID: 583 913 703)

Drop-In Office Hours: Tues 1:15pm-1:55pm

Appointment Office Hours ([sign-up link](#)): Wednesdays 3:30-5pm

Teaching Fellow: []

Office Hours: at KAP 337

Email:

Discussion section: Tuesday: 6-6:50pm - GFS 222

Thursday: 6-6:50pm – GFS 107

**Course Overview**

This course follows Introduction to Statistics for Economics (Econ 317). It is intended to provide students with an understanding of and experience with the key methods economists use to quantify the relationships among variables. A major goal is to prepare students to carry out high quality statistical analysis themselves.

The main focus will be on multivariate regression, causal inference, and basic machine learning. We will consider a number of types of data, including cross-sectional data, time series data, and panel data. Practical as well as theoretical issues will be discussed in how to distinguish correlations from causal effects.

Students will become proficient in the use of STATA, a leading computer program for statistical analysis in the social sciences. We will go through the steps of obtaining and coding data for use in an analysis. Review sessions and problem sets will provide experience in the use of econometric techniques to analyze data.

**Readings:**

Required Text

Jeffrey M. Wooldridge, Introductory Econometrics: A Modern Approach

**You do NOT need to purchase the latest version of the textbook** – any edition after the 4<sup>th</sup> edition is fine, since there are few differences between the editions after that except for the price. You can also search online for digital versions: these are often available for a lower cost.

Supplementary Texts

If we are able to cover the material as on the calendar, I will give an introduction to machine learning during the last 1.5 weeks of the course. An excellent book is An Introduction to Statistical Learning by James, Witten, Hastie and Tibshirani. The material in the textbook is at more advanced level than in this course, and I will not go into that level of detail in class. You do not need a copy, it is only a reference – all test and problem set material will be based on class lectures. Statisticians are more generous than economists, so you can get a free copy on

Professor James' website at <http://www-bcf.usc.edu/~gareth/ISL/ISLR%20First%20Printing.pdf>.

## STATA

The computer program STATA will be used extensively in the course. The program has good help facilities and guides available for free on the internet. UCLA maintains an excellent web site devoted to STATA (<https://stats.idre.ucla.edu/stata/>). TA sections will be used to go over key STATA commands. If you have a question, you can likely google it and find an answer. Popular sites for answering questions about Stata include Statalist and StackOverflow.

STATA is available on public computers around campus, so you do not absolutely need to purchase it. However, it will probably be helpful to have on your personal computer. You can purchase STATA by following the instructions at <https://itservices.usc.edu/stats/stata/>. You can choose either STATA BE, SE, or MP. STATA BE is fine for this course and the least expensive option (\$48 for a 6 month license). Any version of Stata after version 14 is fine.

## Requirements

1. Problem sets (20%):
2. Quizzes (20%)
3. Empirical Project (10%)
4. Midterm exam (20%)
5. Final exam (30%)

Problem Sets: Problem sets will include both analytical problems and empirical problems that involve computing. Your lowest problem set grade will be dropped, so you can miss one with no questions asked. However, it is recommended that you attempt all of the problem sets. **I do not accept late problem sets.** You are permitted to work in groups on the problem sets, but you must do all your own computing and write up your own answers. You must indicate the name of group members on your assignment. There will be a link on blackboard for uploading each problem set where you can submit them as a scan or photo.

The problem sets will be graded by the TA. I will randomly select a few of the questions on the problem set to be fully graded based on correctness. The remaining problems will be graded based on completion rather than correctness. You can check those problems against the solutions.

Quizzes: These will be posted each week to blackboard and contain 10 questions, each worth 10 points. They are to ensure that you are keeping up with the material even during weeks that you do not have problem sets. Quizzes are open-book, meaning that you can use your textbook and class notes when taking them. However, you cannot consult with other students. Quizzes for a particular week must be taken by Monday night at 11:59pm. The lowest 2 quiz grades will be dropped, so you are fine if you have to miss some.

Your graded responses to the quiz questions are available after Monday night at 11:59pm, so you can see what you got wrong/the right answer. To access these, go to the Grade Center for the course and click on your grade for that particular quiz. This will take you to a page that displays your results, as well as the correct answer and an explanation of why that answer is correct.

Empirical Project: For this project, you will work independently to apply the data analysis and econometrics skills you have learned in the class. You will analyze real-world data to answer an important economic question and write up a short report on it. Unlike in the labs, you will not have detailed guidance on how

to complete each step of the project: you will have to decide on how to merge, rearrange, and clean the data sets to make them usable. You can either work on your own or in a pair, where the report must be slightly longer if you choose to work as a pair.

Exams: There will be two exams for the class: one midterm and one final. Please contact me at least two weeks prior to the exam if you will need any accommodations.

**TA Sessions:**

Attendance at the weekly TA sessions is **highly recommended** but not required. During the TA sessions, the TAs will instruct you in how to use Stata, which is necessary for completing the problem sets. You will also be tested on your knowledge of Stata during the exams. The TAs will also go over important concepts from class and problem sets.

**Schedule of Readings and Lecture Topics**

It is recommended that you do the reading or read the slides for a particular class before coming to class so that you are prepared and can ask questions if you were confused. Slides will be posted prior to lecture, so you can take notes on them or separately.

	<b>Topics</b>	<b>Readings</b>	<b>PSet</b>	<b>Lab</b>
<b>Week 1</b> August 23	Course introduction Begin review of probability and properties of data from Econ 317	Chapter 1		Introduction to Stata Lab #1: Job training (part 1)
August 25	Continue review of probability/data properties from Econ 317	Appendix A Appendix B1-B5		
<b>Week 2</b> August 30	Linear models	Ch 2.1-2.5		Lab #2: Job training (part 2)
September 1	OLS estimation	Ch 2.1-2.5		
<b>Week 3</b> Sept 6	Multiple Linear Regression	Ch 3.1-3.5	PS #1 due	Lab #3: Microcredit (part 1) <i>We will post a recording for the Monday section</i>
Sept 8	Multiple Linear Regression	Ch 3.1-3.5		
<b>Week 4</b> Sept 13	Statistical Inference	Appendix C	PS #2 due	Lab #4: Microcredit (part 2)
Sept 15	Statistical Inference with Linear Regression	Ch 4.1-4.3		
<b>Week 5</b> Sept 20	Testing Multiple Hypotheses	Ch 4.4-4.5		Lab #5: Vietnamese Firms
Sept 22	Developing and Using Regression Models	Ch 6.1-6.3		
<b>Week 6</b> Sept 27	Dummy variables; Decomposing group differences; Interaction terms	Ch 7.1-7.3		Review sessions
Sept 29	Heteroskedasticity robust inference	Chapter 8	PS #3 due	
<b>Week 7</b> October 4	Midterm #1			Monday/Tues section: No lab  Wed/Fri: Lab #6:

				Functional Forms and Interactions
October 6	Linear Probability Model; Logit; Probit	Ch 7.4-7.7 Ch 17.1-a,d		
<b>Week 8</b> October 11	Experiments/Randomized Controlled Trials	<i>Lecture notes</i>		Mon/Tues– Lab #6: Functional Forms and Interactions  Wed/Fri: No lab
October 13	Fall Break			
<b>Week 9</b> October 18	Experiments/Randomized Controlled Trials	<i>Lecture notes</i>		Lab #7: Titanic
October 20	Experiments/Randomized Controlled Trials	<i>Lecture notes</i>		
<b>Week 10</b> October 25	Instrumental variables	<i>Lecture notes</i> Ch 15.1-15.3	PS #4 due	Lab #8: Education Experiment
October 27	Instrumental Variables Two Stage Least Squares and testing for endogeneity	Ch 15.4-15.5		
<b>Week 11</b> November 1	Difference-in-Differences Estimators	Ch 13.1-13.4		Lab #9: Quarter of Birth
October 3	Difference-in-Differences Estimators	Ch 13.1-13.4		
<b>Week 12</b> November 8	First Difference Estimators	Ch 13.5; 14.1-14.2		Lab 10: Minimum wage
November 10	Fixed Effects Models	Ch 13.5; 14.1-14.2		
<b>Week 13</b> November 15	Time series data	Ch 10	PS #5 due	Lab #11: Death penalty and deterrence
November 17	Time series data	Ch 10		
<b>Week 14</b> November 22	Introduction to Machine Learning	ISLR 6.1 and 6.2		No lab
November 24	Thanksgiving holiday			
<b>Week 15</b> November 29	Machine Learning part II	ISLR 6.1 and 6.2 <i>Lecture notes</i>		Review Session
December 1	Review Session			
Final exam	T/Th 10-11:50am: Dec 13 at 8-10am T/Th 4-5:50pm: Dec 8 at 4:30-6:30pm			
Final project	Due by 11:59pm on December 1st			

### Additional Resources

Below I list some resources that you may find useful for this course or future courses. None of the material is required, but all should be available at the library. I have listed some additional econometrics books, but the Wooldridge text is the best.

#### *Econometrics*

1. Mastering Metrics and Mostly Harmless Econometrics by Angrist and Pischke. These are short textbooks with an emphasis on the applications of the tools we develop in this course. Mostly

Harmless Econometrics is more advanced.

2. Introduction to Econometrics by Stock and Watson. This textbook is at a slightly lower level to Introductory Econometrics by Wooldridge.
3. Field Experiments: Design, Analysis, and Interpretation by Gerber, A., & Green, D.
4. Running Randomized Evaluations: A Practical Guide by Glennerster, R., & Takavarasha, K.

#### STATA

5. Microeconometrics Using Stata: Revised Edition by Cameron and Trivedi. An in-depth overview of econometrics with STATA.
6. Statistics with STATA by Hamilton. A good guide to Stata.
7. STATA guides at UCLA and Princeton. Both include tutorials, detailed help files, and web videos.

#### Applied Economics

8. Freakonomics and Superfreakonomics discuss a number of applied economics papers. If you read some of the papers that the books are based on, you will see that they use the econometrics you learn in this course.
9. Some excellent podcasts about applied economics is NPR's Planet Money and The Indicator, as well as the BBC's More or Less.
10. The site websites <http://microeconomicinsights.org/> and <http://voxeu.org/> provide short summaries of economics articles on a variety of topics. Most of the articles are empirical, and many use techniques covered in the course.

#### Policy on Missed Exams

Students must take the exams at the scheduled times. The only valid grounds for a make-up exam is a valid medical excuse with documentation, or extenuating circumstances for which prior arrangements have been made with the instructor. No credit will be given for unexcused, missed exams. Student will receive an F for the course if the final exam is missed for an unexcused absence. If you have a valid reason for missing the final exam, and can document it, you will be awarded an incomplete.

Under the USC ARR Grade Handbook, students are never permitted to omit taking the final exam or take it early. The only possible grounds for taking the final exam at a different time from the rest of the class are: (1) two final examinations that are scheduled for the same time; or (2) more than two final examinations on the same day. If this situation applies to you, you must contact both me and the other involved professors no later than two weeks prior to the examination dates.

#### Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A - <https://policy.usc.edu/student/scampus/>.

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" [policy.usc.edu/scampus-part-b](https://policy.usc.edu/scampus-part-b). Academic misconduct will not be tolerated, and any violations will be reported to the University for adjudication. Portions of your exams will be photocopied before being returned to you to ensure that no alterations are made to test booklets after return in an attempt to receive a higher grade.

#### Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as

early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website for DSP and contact information: (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) [ability@usc.edu](mailto:ability@usc.edu).

### **Emergency Preparedness/Course Continuity in a Crisis**

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies. See the university's site on [Campus Safety and Emergency Preparedness](#).

### **Support Systems:**

*Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. [engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

*National Suicide Prevention Lifeline – 1 (800) 273-8255*

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org)

*Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. [engemannshc.usc.edu/rsvp](http://engemannshc.usc.edu/rsvp)

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: [sarc.usc.edu](http://sarc.usc.edu)

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086*

Works with faculty, staff, visitors, applicants, and students around issues of protected class. [equity.usc.edu](http://equity.usc.edu)

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. [studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations. [dsp.usc.edu](http://dsp.usc.edu)

*USC Support and Advocacy (USCSA) – (213) 821-4710*

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. [studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. [diversity.usc.edu](http://diversity.usc.edu)

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. [emergency.usc.edu](http://emergency.usc.edu)

*USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.*

Provides overall safety to USC community. [dps.usc.edu](http://dps.usc.edu)