USC University of Southern California

Economics 318, 26101R
Introduction to Econometrics

Units:	4
Term—Day—Time:	Spring 2024, Mon, Wed 8:30-10:50 am.
Location:	KDC-240
Instructor:	Manochehr Rashidian, Personal zoom ID 594 296 5704
Office Hours:	Mon, Wed, 11:30-1:00 pm, KAP-116B
	If my office hours are not convenient for you, I am also available by appointment.
Contact Info:	rashidia@usc.edu
Teaching Assistant:	TBD
	Discussions:
	26102R, 6:00-6:50 Mon, room GFS-107
	26104R, 6:00-6:50 Wed, room KAP-137
Office Hours:	
Contact Info:	

Course Description and Overview

Econometrics is the study of using statistical and mathematical methods to understand and quantify economic relationships. It involves analyzing economic data to identify patterns and correlations and can be applied to both macroeconomics (such as examining the effects of public policies or predicting economic indicators like inflation and GDP growth) and microeconomics (such as estimating demand and cost functions or testing microeconomic theories). Econometrics has become increasingly important in both fields as a way to test theories, make forecasts, and evaluate the impacts of various decisions and policies.

We will begin with reviewing the concepts of data presentation and univariate and bivariate random variables. Then we will learn how to estimate and interpret population parameters. The properties of estimators and the process of making inferences about population parameters using statistics will also be covered in his part. The main focus of this course is regression analysis. In the second part of the course, we will cover simple and multiple linear regression models in depth. This part includes topics such as the assumptions of linear regression, building and estimating regression models, evaluating the fit of a model, testing for parameter restrictions, and making forecasts. We will also delve into techniques for relaxing the classical assumptions of linear regression and handling nonlinearities and qualitative variables in regression analysis. Finally, the course will conclude with a discussion of time series analysis and regression with time-series data.

Learning Objectives

This course aims to give students a solid foundation in statistics and econometrics, focusing on using regression methods to analyze and understand economic data and relationships. Upon completion of the course, students will be able to collect and organize data, build econometric models, estimate and test the models, and use the results to make predictions. The goal is to enable students to understand, evaluate, and interpret econometric research in their studies and careers.

Course Notes
- Students should arrive on time to class in order to minimize disruptions.
- Participating in class discussions can earn you extra credit for class participation.
- Taking notes during class is recommended, as exam questions will often be based on material discussed in class. However, reading the textbook is important as your notes are not a substitute for the text.
- Attendance is mandatory. Missing class will negatively impact your class participation points.
- Homework and exam solutions will be posted on the Blackboard after they are completed.
- It is important to regularly check your grades on Blackboard and inform the instructor or TA of any discrepancies.
- This course assumes that students have already taken Econ 317 and have a basic understanding of macro and microeconomic theories and elementary calculus.
- If the university moves classes online due to worsening COVID conditions, lectures and office hours will be held on Zoom. The exams and homework assignments will be submitted using TURNITIN on Blackboard.
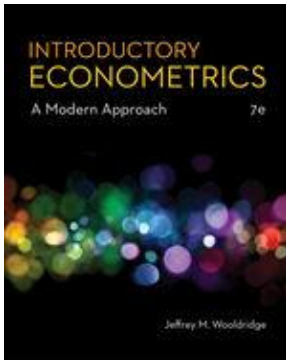
USC Technology Support Links
Zoom information for students
Blackboard Help for students
Software available to USC Campus

Required Readings and Supplementary Materials
The required text is **Wooldridge, Jeffrey "Introductory Econometrics, a Modern Approach,"** South-Western Cengage Learning. 7th Edition,

The textbook's website contains the data you need for your assignments. The website is:
https://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781337558860&token=89EEF5AC408826CD381C3B27F19B3BD859B7EA69CEEC2862139E3103F28A65F8B5723398CC46DB404DBD2F5133810D34C7CE7229B0384EDDF43D55641137D5F4B0C5319725D38EF2

The class lectures are organized in the same sequence as in the textbook. But if you don't like the presentation style of the text, you can find the same topics in any of the following books.

Ramanathan, Ramu, Introductory Econometrics with Applications. 5th Edition.
Stock, and Watson, *"Introduction to Econometrics,"* 3rd Edition, Addison Wesley
Studenmund, A. H. Using Econometrics: A Practical Guide, Addison Wesley Longman.
Goldberger, A. (Latest Edition). Introductory Econometrics, Harvard.
Hill, C., W. Griffiths, and G. Judge. Undergraduate Econometrics, Wiley
Gujarati, D. (Latest Edition), Basic Econometrics, McGraw-Hill.
Johnson, A., M. Johnson, and R. Buse, Econometrics: Basic and Applied.

Computer Software Information

Learning how to use statistical software is part of the requirements for this course. If you are already familiar with a well-known statistical software such as SAS, STATA, R, MINITAB, EVIEWS, SPSS, and R, you may use it for your assignments and classwork. Most of these software programs and instructions about using them are available on the network at USC. I will use the STATA program for class demonstrations. If you like to have your copy of STATA software, the student version (STATA/IC) is available on the STATA website:
http://www.stata.com/order/new/edu/gradplans/student-pricing/#

Description and Assessment of Assignments and Exams

The syllabus lists the end-of-chapter homework assignments and their due dates. In addition, more problems will be assigned from the class lectures. The additional problems will be posted on the Blackboard. Due dates for the homework assignments may be subject to change, and any changes will be announced in class and posted on the Blackboard. Homework assignments must be submitted on time, typed or handwritten, and include a printout of any empirical results. Late homework assignments will not be accepted or credited after the solutions are posted on the Blackboard.

This course will include two quizzes, a midterm, and a final exam. All quizzes and exams will consist of problem-solving and short answer questions. While the quizzes are not cumulative, students must review earlier material as most chapters build upon one another. The final exam will cover selected chapters from throughout the course.

In addition to exams, students must complete a group project involving collecting data, building and estimating a model, and presenting the results. In class, I will provide more information about the group project and its requirements.

Grading Breakdown

The course will be graded on a 100% scale unless the class average falls below my expectations. In this case, I will adjust your grades using a curve based on the average performance of students who complete the course. Depending on the class performance, the class average is usually considered to be a B,

Weights for homework and exams are

Activity	Percentage of Grade
Homework and class participation	20%
Quizzes	20% (10% each)
Midterm exam	20%
Group Project	10%
Final exam	30%
Total	100%

Assignment Submission Policy

The due dates for the homework assignment are in the following table. Any changes in the due dates will be announced in class or posted on the Blackboard. Students must turn in their homework as instructed by their TA. If you need special accommodations for submitting your assignment or taking exams, please let me know as soon as possible.

Homework assignments are due on the dates listed in the table provided. Any changes to the due dates will be announced in class or posted on Blackboard. Students should follow their TA's instructions for submitting assignments. If you require special accommodations for submitting assignments or taking exams, please notify the instructor as soon as possible.

Course Schedule: A Weekly Breakdown (this is a tentative schedule, any changes will be announced in class or posted on the Blackboard)

	Topics/Daily Activities	Readings and Homework Assignments	Due Dates
Week 1	**Appendix A, Read it yourself** **Appendix B,** Random variables and their probability distribution, Joint, marginal and conditional distributions Expected value, variance, the standard deviation of random variables, and their properties Normal and related distributions	Appendix A: 2, 6, 8, 10 Appendix B: # 4, 8, 10 Class problem set (1.5)	
Week 2	**Appendix C,** Random sampling, Estimators, and estimates Finite and asymptotic properties of an estimator, Confidence interval, and hypothesis testing	Appendix C: #2, 6	
Week 3	**Chapter 1,** Introduction to econometrics and structure of economic data **Chapter 2,** Simple linear regression, deriving the OLS estimates	Chapter 1, # 4, C2, C4 Class problem set (1.5) Chapter 2, # 4, 6, C4, C6 Class problem set (1.5)	
Week 4	Interpretation of the parameter estimates SLR assumptions and properties of OLS estimates, testing a single parameter **Chapter 3,** Mechanics and interpretation of Multiple Linear Regression (MLR) Assumptions and properties of MLR, Efficiency of OLS Confidence intervals and Testing Hypotheses about a single population parameter	Chapter 3, # 4, 6, C6, C8 Class problem set (1.5)	
Week 5	Confidence intervals and Testing Hypotheses about a single population parameter in MLR **Chapter 4,** Testing for linear restrictions on parameters in MLR, t-test, and F tests	Chapter 4, # 6, 10, C2, C6, C8 Class problem set (2.5)	
Week 6	R^2 and its interpretation, testing for General linear restrictions, P-value and its interpretation **Quiz 1**		

Week 7	**Chapter 5,** Asymptotic properties of OLS, Large sample tests, the Lagrange Multiplier test	Chapter 5, # 4, C2, C6 Class problem set (1.0)	
Week 8	**Chapter 6,** Econometrics modeling Using logarithmic functional forms Other nonlinear functions Adjusted R^2, Prediction, and residual analysis	Chapter 6, # 4, 6, C6, C12 Class problem set (2.0)	
Week 9	**Chapter 7,** Qualitative variables and use of dummy variables in regression analysis Interactions between dummy variables **Midterm Exam**	Chapter 7, # 2, 10, C6, C8, C10 Class problem set (2.5)	
Week 10	Chow's test of model differences Binary dependent variables and linear probability model Binary Response Model, Logit and Probit Models	 Lecture Notes (Class problems)	
Week 11	**Chapter 8,** Heteroskedasticity and its consequences Heteroskedasticity robust inference Testing for Heteroskedasticity Breusch-Pagan, White's and other tests of Heteroskedasticity Weighted Least Squares and its properties	Chapter 8, # 4, 6, C4, C8 Class problem set (2.5)	
Week 12	Feasible Generalized Least Squares and its properties **Chapter 10,** The nature of time series, Time series assumptions Finite sample properties of OLS **Quiz 2**	 Chapter 10, # 2, C2, C12 Class problem set (1.5)	
Week 13	Trend and seasonality Spurious regression and how to correct for it **Chapter 12,** Serial correlation and heteroscedasticity in time series Properties of OLS with serially correlated errors	 Chapter 12, # 2, 6, C6, C10 Class problem set (2.0)	

Week 14	Testing for serial correlation of 1st order, t-test, and Durbin-Watson tests Correcting for 1st order serial correlation FGLS and iterative FGLS methods Testing and correcting for higher-order serial correlation		
Week 15	Robust inference with serial correlation Autoregressive conditional Heteroskedasticity (ARCH) model Heteroskedasticity and serial correlation in linear regression		
FINAL Exam			

Policy on Missed Exams
Students must take the exams as scheduled. There will be no make-up exams unless the student has a valid medical excuse and can provide documentation for such a reason. If a student cannot take the exam because of extenuating circumstances, prior arrangements must be made with the instructor. Students will receive zero credit for unexcused missed exams. The student will receive an F for the course if the final exam is missed for an unexcused absence, regardless of the student's performance during the semester. If a student has a valid reason for missing the final exam and can document it, they will receive an incomplete grade.

Academic Conduct
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 Section 11, *Behavior Violating University Standards*https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu/ or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems
A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.htmlprovides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* *http://emergency.usc.edu/*will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.