Instructor:	Rui Liu, PhD
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Office Hours:	Monday 4:00-5:00 PM (in-person) or Tuesday 12:00-1:00 PM (virtual) or by appointment
Class Days/Time:	Monday 6:00PM - 8:45PM
Classroom:	DMH 165
Prerequisites:	ECON 203A or Instructor Consent

Course Description

This course will extend your knowledge of econometrics beyond the linear models you used in ECON 203A. Econometrics is a tool which allows one to use data and statistical techniques to answer real-world questions and test predictions of economic theory. This course is the second in a two-course sequence on basic applied econometrics. It focuses on applications and interpreting the findings of econometric studies.

The goal of this class is for you to be able to interpret the results of the linear regression model you learned about in ECON 203A, as well as to learn additional topics such as use of panel data, nonlinear regression functions, limited dependent variable models, instrumental variables models, and introductory time series. You should also be able to use these various models to analyze data, and critically assess studies using these models. An important part of the class will be use of R, a free software environment for statistical computing and graphics, to analyze data. Econometrics is used in business, government, and academia for purposes such as studying the effects of government policies, using historical data to forecast future values of variables such as the stock market, analyzing markets, and testing the predictions of economic theory. Knowledge of econometrics is valuable for many types of jobs. Knowing a programming language such as R is also valuable.

We will cover the following topics: regression with a binary (0–1) dependent variable, regression with panel data, instrumental variables regression, regression discontinuity, introductory time series, and if time permits, experiments and quasi-experiments. The class prerequisite includes ECON 203A (which reviewed probability and statistics and covered linear regression). The textbook reviews some basic probability and statistics as well as linear regression.

Course Format

During the scheduled times for the course (Monday 6:00 P.M.-8:45 P.M.), I will lecture on the material, hold in-class discussions, and answer questions in person. Lecture slides, labs, and other supplemental materials will be posted online by the end of the day in which the in-person session occurs. Assignments will always be submitted online and due at regular times (typically 6:00 PM Monday).

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. critically evaluate econometric models and point out potential sources of bias,
2. explain how panel data and difference-in-difference designs can be used to overcome omitted variables bias,
3. explain how instrumental variables designs can be used to overcome omitted variables and simultaneity bias,
4. describe the requirements for a compelling regression discontinuity design,
5. compare and contrast time series techniques for prediction with econometric techniques for causal inference.
6. formulate an interesting and important research question,
7. locate useable data from Internet or other sources,
8. search and analyze scholarly literature related to research question,
9. develop a statistical model that can be used with the data to answer a question which contributes to the literature.
10. effectively communicate methodological approach and results of empirical econometric analysis.

The Course Learning Outcomes (CLOs) are connected to Program Learning Outcomes (PLOs) and course assignments as follows.

CLO Assessed	PLO Assessed	Assignments
1, 2, 3, 4, 5	3, 4	Problem Sets, Chapter Quizzes, In-Class Lab, Exams
6, 7, 8, 9, 10	3, 4, 5	Term Paper, Presentations

Required Texts/Readings

Textbooks

The following econometric references are not required, but will prove useful (both in this class and in life):

Stock, J.H. and Watson, M.W. 2011. *Introduction to Econometrics*. Pearson; 3rd edition. ISBN: 9780138009007

Bailey, M.W. 2016. *Real Econometrics: The Right Tools to Answer Important Questions.* Oxford University

- An Introduction to R
- R for Beginners
- Introduction to R for Finance
- Try R (a short course that lets you jump right in)
- Computing for Data Analysis (4 weeks worth of videos from a popular Coursera course)
- Quick-R. (Great website for learning R in a hurry.)

Course Requirements and Assignments

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

Grading Policy

Your grade will be based on the best 5 of 6 problem sets (total of 20 percent), participation in class (5 percent), chapter quizzes (10 percent), a midterm (15 percent each), a final exam (20 percent), two presentations (10 percent), and a term paper (20 percent). The final will be cumulative, but more heavily weighted toward the second half of the class.

Homework

There will be 6 problem sets, but I will only count the best 5 out of six problem sets towards your grade. They will be due by the beginning of class on the date they are due on Canvas. Late homework will receive no credit (but remember that you can drop the lowest homework score). The problem sets will come from the text and elsewhere. You may work together on the problem sets in groups up to size 3, but you will have a difficult time on the exams if you do not understand the homework material/cannot do the problems yourself. Everyone must turn in their own write ups of the problem sets, and must note who they worked with on their problem set. Problem sets are to be submitted electronically through the class Canvas page (typically Monday at 11:59 pm). For R work, I suggest that you either copy and paste statistical output and graphs from R into a word processor (e.g MS Word) or use R markdown within R studio.

Class Participation

The participation grade will be based on attendance and participation in in-class lab activities, and completion of in-class lab questions. Material covered in the lab may be included in lecture exams.

Exams

There will be one in-class midterm exam on Monday, April 8. The final will be during the University's assigned finals period on Monday, May 20th, from 5:15 pm to 7:30 pm. The final will be cumulative, but with more emphasis on the material in the second half of the course. The exams emphasize conceptual understanding as well as applications. Questions will be similar to the problem sets and quizzes, except without the need for computing in R.

Exam Policy

There will be no rescheduling of any exams. If you are unable to attend the in-class midterms or final exam, you must provide a legitimate excuse, such as a note from your doctor. Any doctor's note or other legitimate excuse must include a privacy waiver form allowing the Department of Economics to call the doctor's office to verify the authenticity of the note. There will be no makeup exams. If you have a valid excuse for missing the midterms, all of the exam part of your grade will be determined by the other exam.

Term Paper

The purpose of this project is to provide an opportunity to formulate an economic model, estimate the model with appropriate data, and interpret the results. This experience will help you understand how econometrics

Grade	*Percentage*
B	*83 to 85%*
B minus	*80 to 82%*
C plus	*76 to 79%*
C	*73 to 75%*
C minus	*70 to 72%*
D plus	*66 to 69%*
D	*63 to 65%*
D minus	*60 to 62%*
F	*59% or below*

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.