San José State University
College of Social Sciences/Department of Economics
ECON 203B, Seminar in Econometric Methods, 01, Spring, 2022

Course and Contact Information

Instructor:	Rui Liu, PhD
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Email:	Rui.Liu@sjsu.edu
Office Hours:	Wednesday 12PM-1PM or by appointment
Class Days/Time:	Wednesday 6:00PM - 8:45PM
Classroom:	[Zoom Link for Lecture and Office Hours](#) Password: 203
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

Technology Intensive, Hybrid, and Online Courses

This course is taught in a hybrid format, providing a mixture of regular synchronous activity where we all can interact in real time, with asynchronous material, which can be done remotely at your own pace.
I will be holding all synchronous class sessions remotely on Zoom. You can attend these sessions on your computer or device from your dormitory or home.

During the synchronous, scheduled times for the course (Wednesday 6:00 P.M.-8:45 P.M.), I will lecture on the material, hold in-class discussions, and answer questions in real time on Zoom. Attendance to the live portion is strongly encouraged, but not required. Lecture slides, videos, and other synchronous materials will be posted online by the end of the day in which the live session occurs. Assignments will always be submitted online and due at regular times (typically 6:15 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

Textbook

Bailey, M.W. 2016. Real Econometrics: The Right Tools to Answer Important Questions. Oxford University Press; 2nd edition. ISBN: 9780190857462.

We will cover the material in Chapters 8–13 of Bailey (and 14 if time permits). There is a website with companion material to the text under "Student Resources" at https://learninglink.oup.com/access/bailey-real-econometrics2e-student-resources#all_resources. You need to have access to this book to work on the problem sets and prepare for the exams.

If you need a refresher on statistical concepts, the following book is a good resource: Introductory Statistics with Randomization and Simulation by Diez, Barr, and Çetinkaya-Rundel. Available free of charge at: https://www.openintro.org/book/isrs/.

Other Readings
1.) Angrist, J. D. and Pischke, J. 2014. *Mastering Metrics,* Princeton University Press, Princeton, N.J.

2.) Stock, J.H. and Watson, M.W. 2011. *Introduction to Econometrics*. Pearson, 3rd edition.

Other technology requirements / equipment / material

Computers have transformed how statistical analysis is conducted in everyday work. In this class, we will learn how to use the computer for managing and analyzing data, and writing paper. All of this will be done using the following very widely used, free and open-source software. Mastering these tools, even only their very basics, will give you a huge advantage in both industry and academia.

• R, a system for statistical analyses and graphics.
• RStudio, an integrated development environment for R.

We will use a free, cloud-based version of R and RStudio, which you can find here: https://rstudio.cloud. This cloud version seems to work very well and has the big advantage that you don't have to deal with installation hassles. On the downside, this project is currently in an alpha version, meaning it is under active development. Currently, all projects are limited to 1GB of working memory, which should be sufficient for our purposes. In case you work with very large datasets, or you want to set up your own computer for data analysis: R is available as a free download from http://lib.stat.cmu.edu/R/CRAN/. RStudio is available free of charge from http://www.rstudio.com/products/rstudio/download/. Choose the free Desktop license.

Empirical exercises in this class must be completed using R. If you took Economics ECON 203A or ECON 103A, you are already familiar with R. Here are some links to help you learn it:

- 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 6:30 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.

Due dates for problem sets are as follows:
1. Problem set 1: Monday February 15 at the beginning of class
2. Problem set 2: Monday March 8 at the beginning of class
3. Problem set 3: Monday March 22 at the beginning of class
4. Problem set 4: Monday April 12 at the beginning of class
5. Problem set 5: Monday April 26 at the beginning of class
6. Problem set 6: Monday May 17 at the beginning of class

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 March 22. The final will be during the University's assigned finals period on Monday May 24, from 07:45 pm to 10:00 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 final exam and other midterm.

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 relates to other economics courses which focus on theoretical models for how the world operates. Econometrics provides a method of testing the validity of these economic models. Additionally, the term paper will improve your writing skills and give you a chance to write clearly and concisely about technical material.

This project will involve replicating the analysis presented in an empirical paper, and possibly presenting further analyses of the data set used in the paper. As an alternative, you may use a data set of your own choosing and carry out an original analysis, using your own research. A major goal of this exercise is organization and presentation of a carefully written report.

The six phases of this project (and report due dates) are:

1. Choosing topic and introduction (due by 6PM on April 5) – GROUP REPORT
2. Collecting data, and making a short presentation of your research topic (due by 6PM on April 12) – GROUP REPORT
3. Conducting econometric analysis (due by 6PM on April 19) – INDIVIDUAL REPORT
4. Writing the draft (due by 6 PM on May 3), with five sections (plus a References section) with the following titles: Introduction, Literature Review & Economic Theory, Description of Data, Empirical Results, Conclusion. – INDIVIDUAL REPORT
5. Meeting with a writing tutor from the Writing Center to receive feedback, and making a short presentation, using slides (due by 6 PM on May 17) – INDIVIDUAL REPORT
6. Submitting the complete paper with script (due by 6 PM on May 21). Papers must include an abstract. In the Conclusion, students must critically evaluate the models they present, and discuss ways to improve them in future work. -– INDIVIDUAL REPORT

You are required to work as a team in choosing a topic, collecting the data, and starting to do your regression analysis. However, you are required to work alone in writing up your econometric analysis for PHASE 3 and in developing and writing your paper and slides for Phases 4-6.

Grading Questions and Grade Change Requests

If you think that your assignment has been graded incorrectly, you must write up why you think so and discuss the issue with me within 1 calendar week of getting the exam back. Note that your entire exam is open to regrading, so your grade could go down as well as go up. No regrade requests will be considered after that point.

Academic Honesty

All students should be familiar with the University's policy on academic honesty, https://www.sjsu.edu/studentconduct/docs/SJSU-Academic-Integrity-Policy-F15-7.pdf.

Intentional plagiarism is academic dishonesty. Plagiarism occurs when you accidentally or purposefully do any of the following in an assignment:

Use someone else's words either verbatim or almost verbatim without attribution,
Use someone else's evidence, line of thinking, idea, without attribution,
Turn in some else's work as your own, as in copying a peer's paper or purchasing a readymade paper,
Turn in previously submitted work as new work without instructor approval.

If I discover any evidence of cheating, dishonest conduct, plagiarizing, or inappropriate collusion on exams, homework, or term paper, the students will be given Fs for the work in question, will also make him/her liable for referral to Student Conduct and Ethical Development for further disciplinary action. These terms are explicitly defined at the URL above.

Final Examination or Evaluation

The course will conclude on May 24, 2021 with a cumulative final exam. The exam will include both multiple choice and short answer questions. The questions will be based on material from throughout Econ 203 A and B. The final exam questions can be broken down into three parts: about one-third of the questions will be based on *readings*, another third of the exam questions will be multiple choice questions based on the *quizzes and problem sets*, and the final third will be based on topics discussed in *lectures* and on which you should have taken notes. There are no bathroom breaks during exams so please plan accordingly.

Grading Information

Below is a list of the percentage weight assigned to various class assignments.

Assignment	*Percent of Grade*	*Due Dates*
Term paper (due in multiple phases)	20	Topic and Intro April 5, Data April 12, Econometric Analysis April 19, Draft May 3, Final Paper May 21
Presentations	10	April 12, May 17
Problem sets	20	See Canvas
Midterm Exam	15	March 22
Final Exam	20	May 24, from 07:45 pm to 10:00 pm
Participation in class	5	Throughout
Chapter quizzes	10	See Canvas

Grades are determined as follows:

Grade	Percentage
A plus	96 to 100%
A	93 to 95%
A minus	90 to 92%

Grade	Percentage
B plus	86 to 89 %
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.

ECON 203B / Seminar in Econometric Methods, Spring 2022, Course Schedule

Course Schedule

Lesson	Date	Topics, Readings	Assignments, Deadlines
1	2/1	Review of linear model Regression with a binary dependent variable (Chapter 12)	
2	2/8	Regression with a binary dependent variable (Chapter 12)	
3	2/15	Regression with panel data (Chapter 8)	HW 1 due
4	2/22	Regression with panel data (Chapter 8)	
5	3/1	Regression with panel data (Chapter 8)	
6	3/8	IV regression (Chapter 9)	HW 2 due
7	3/15	IV regression (Chapter 9)	
8	3/22	Experiments (Chapter 10)	Midterm HW 3 due
9	4/5	Experiments (Chapter 10)	Project phase 1
10	4/12	Regression Discontinuity (Chapter 11)	HW 4 due Project phase 2 Presentation
11	4/19	Regression Discontinuity (Chapter 11)	Project phase 3
12	4/26	Time Series (Chapter 13)	HW 5 due
13	5/3	Time Series (Chapter 13)	Paper draft due Project phase 4
14	5/10	Time Series (Chapter 13)	
15	5/17	Last Day of Instruction Presentation	Project phase 5 HW 6 due
Term Paper	5/21	No class	Paper due by 6 PM on May 21
Final Exam	5/25	Online, Monday May 24, from 07:45 pm to 10:00 pm	