

Syllabus
Econ 103A: Introduction to Econometrics & Research Methods
San Jose State University
Online
Summer 2022

Instructor: Dr. Marjan Orang
Email: marjan.orang@sjsu.edu

Office Hours: Tuesday 10-11am @ <https://sjsu.zoom.us/j/81933948543>

Welcome to Econ 103A, Introduction to Econometrics & Research Methods!

Course Description

Research methods and core econometric techniques for analysis of causal effects, from difference-in-means tests of experimental data through multiple regression analysis of observational data. Topics include selecting an appropriate research question, reviewing the relevant literature, and obtaining data. Core econometric techniques used to analyze data in an original term paper.

Grading and Classroom Policy

This is a 4-unit course. The grading scale is: 60-62, D-, 62-68, D, 68-70, D+, 70-72, C-, 72-78, C, 78-80, C+, 80-82, B-, 82-88, B, 88-90, B+, 90-92, A-, 92-98, A, 98-100, A+. I generally don't allow makeup assignments unless there is sufficient notice and a well justified and documented reason.

Online Lectures and Daily Office Hour

Lectures will be posted on Canvas under weekly Modules starting July 5th, 2022. I will hold office hours every Tuesday from 10-11am to coach you on completing these weekly modules.

Please use the below link to connect to the Office Hour Meeting:

<https://sjsu.zoom.us/j/81933948543>

Meeting ID: 819 3394 8543

International numbers available: <https://sjsu.zoom.us/j/81933948543>

Suggested Textbooks:

- 1.) Bailey, M.W. 2016. Real Econometrics: The Right Tools to Answer Important Questions. Oxford University Press; 1st edition.
Resources: <https://global.oup.com/us/companion.websites/9780190296827/>
- 2.) Holian, M. J. Forthcoming. Data and the American Dream: Contemporary Social Controversies and the American Community Survey. Palgrave Macmillan.
Excerpts from this in-progress manuscript will be provided to students in class.
- 3.) Angrist, J. D. and Pischke, J. 2014. Mastering Metrics, Princeton University Press, Princeton, N.J. Resources: www.mastermetrics.com

Another Recommended Textbook

1.) Stock, J.H. and Watson, M.W. 2011. Introduction to Econometrics. Pearson, 3rd edition. This is the book we use in the graduate econometrics sequence, although it is perfectly accessible to undergraduates. Any recent edition is suitable. See also the publisher's Student Resources page for replication files for the book in Stata format:
http://wps.aw.com/aw_stock_ie_3/178/45691/11696965.cw

Required Computer Software

All students must have installed on their home machines free R and R Studio software. Students whose computers have limited memory are advised to create a free R Studio Cloud account.

Course and Program Learning Objectives (CLOs and PLOs)

This course reinforces PLO3: research methods and PLO5: communication, and introduces PLO4: areas: quantitative methods.

Specific CLOs for this course include:

- CLO 1.) Explain basic methods in econometric and identify correct procedures
- a) Explain the difference between a variable and a statistic in the context of a regression equation.
 - b) Define the terms "causal effect" and "ideal experiment". Explain the difference between descriptive statistics, inferential statistics, and causal inference.
 - c) Give two examples of difference-in-means tests, using experimental and observational data, and explain when we can and cannot interpret a difference-in-means as an estimate of a causal effect.
 - d) Describe how to use a simple (bivariate) regression model to carry out a difference in means test.
 - e) Give an example of a regression coefficient estimate that suffers from omitted variable bias, and explain how the regression control technique could reduce bias in the example.
 - f) Describe all the numbers in a Stargazer regression table in R; identify the main independent variable of interest, interpret the econometric models, test their statistical significance and evaluate them in terms of any potential bias.

- g) Discuss best practices in estimating standard errors.
- h) Discuss an example of a natural experiment, where: 1.) a difference-in-means is a plausible causal effect, and 2.) where a difference-in-difference(D-in-D) in means is a plausible causal effect.
- i) Finally, explain how an interaction model automates estimation of a D-in-D estimate.

CLO 2: Use technology to analyze data

- a) Create summary statistics for variables in a data set using the R software program.
- b) Estimate a regression model(coefficients and standard errors)and create a scatterplot with a regression line in R.
- c) Download data from the Internet and read it into a statistical software package
- d) Run an R script associated with a published research study by modifying the directory path, installing required packages, loading data, and obtaining results.
- e)Create a new script by modifying an existing script, and use your original results in a term paper

CLO 3: Prepare a scholarly research paper describing an original regression analysis:

- a) Formulate an interesting and important research question.
- b) Locate and describe data from Internet or other sources.
- c)Search and analyze scholarly literature related to research question.
- d)Write a review of econometric literature that is integrated and not merely an annotated bibliography; list and describe relevant studies and their research questions, the data and methods they used, and the results they found. Highlight any studies that provide compelling estimates of well-defined causal effects, or explain why a study does not.
- e) Develop, estimate and interpret a statistical model that can be used with the data to answer a question which is original and contributes to the literature.

Grading:

Your course grade will be determined as follow:

| Assignment | Points | Due Dates |
|---------------------------------------|--------|----------------|
| Check-in Assignments | 25 | |
| HW Assignments | 25 | |
| 2,000 word term paper (due in phases) | 50 | Due August 1st |

Grades will be based on the usual grading scale and out of 100 points.

Detailed rubrics for the term paper can be found at the end of this syllabus. We will have weekly check-in conversations when I will evaluate your progress and help where needed. I will assess completion of learning objectives through your work. Students will submit assignments on Canvas and we will communicate over the daily zoom office hour.

Academic integrity

Cheating or plagiarism (presenting the work of another as your own) will result in a failing grade and sanctions by the University. Faculty members are required to report all infractions. Note: The term paper involves a replication and students will find references in the original studies they can use in their literature review sections. However, do not just paraphrase the description of this literature. I will consider too much paraphrasing to be unoriginal and it may result in a failing grade on the term paper, and reporting to the Student Conduct office.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' web page at <http://www.sjsu.edu/gup/syllabusinfo>

Course Schedule

| Date | Module # | Lecture Topic | Readings |
|-----------|----------|-----------------------------------|------------------------|
| July 5th | 1 | Intro: What is Econometrics | Holian Ch 8 (Appendix) |
| July 5th | 1 | Ch1: Identification and inference | Bailey Ch 1 |
| July 12th | 2 | Regression in R | |
| July 12th | 2 | Ch2: Research Habits | Bailey Ch 2 |
| July 19th | 3 | Ch3: Bivariate Regression | Bailey Ch 3 |
| July 19th | 3 | Ch4: Hypothesis Testing | Bailey Ch 4 |
| July 26th | 4 | Ch5: Multivariate OLS | Bailey Ch 5 |
| July 26th | 4 | Ch6: Dummy Variables | Bailey Ch 6 |
| July 26th | 4 | Ch7: Specifying Models | Bailey Ch 7 |
| Aug 2nd | 5 | Term Paper Due | |