Syllabus

Econ 103A - 02 Introduction to Econometrics & Research Methods
San Jose State University
Synchronous online class time: Tues-Thurs 10:30AM – 11:45AM
Fall 2020

Instructor: Dr. Marjan Orang
Email: marjan.orang@sjsu.edu
Office Hours: by appointment

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 Lecture Meeting

Marjan Orang is inviting you to a scheduled Zoom meeting.

Topic: Econ103A Zoom Meeting
First Lecture Time: Aug 20, 2020 10:30 AM Pacific Time (US and Canada)

Join from PC, Mac, Linux, iOS or Android:
https://sjsu.zoom.us/j/91255107008?pwd=WFpZTIvtaU10bDFxdXUvbTcyekdLQT09
Password: 638824

Or iPhone one-tap : US: +16699006833,,91255107008# or +12532158782,,91255107008#
Or Telephone: Dial(for higher quality, dial a number based on your current location) :
US: +1 669 900 6833 or +1 253 215 8782 or +1 346 248 7799 or +1 312 626 6799 or +1 646 876 9923 or +1 301 715 8592
Meeting ID: 912 5510 7008
International numbers available: https://sjsu.zoom.us/u/aK9SIAPRu
Required Textbooks


3.) 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.

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 sand 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.

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.

The CLOs will be assessed through a term paper and oral examinations.

Grading:

Your course grade will be determined as follow:

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<tr>
<th>Assignment</th>
<th>Points</th>
<th>Due Dates</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>10</td>
<td></td>
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<tr>
<td>HW assignments</td>
<td>25</td>
<td>Selected Tues by 10:30am</td>
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<tr>
<td>Weekly Oral Exams/Group Check Ins</td>
<td>25</td>
<td></td>
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<tr>
<td>2,000 word term paper (due in phases)</td>
<td>40</td>
<td>Oct 6th, Nov 17, Dec 1st</td>
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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, and I will assign readings, software and writing assignments that will help you complete the learning objectives. Students will submit assignments on Canvas and we will communicate over Zoom video link.
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

Term Paper Components and Instructions

Students will write a term paper to analyze an economic/social/behavioral question or to verify a previously published study. The studies listed below are examples of the types of studies students you can attempt to verify and then extend or re-analyze in some way.

Outline:

By 10:30a.m. on Oct 6th students will write up 1.) an abstract describing their question or replication and extension study, and 2.) an outline that contains the title, written as a one sentence research question, five sections with section names, a complete bibliographic citation to the study you will attempt to verify, a regression equation you will estimate with a description of the variables, coefficients and estimation subsample. In the regression equation, index variables to make it clear to the reader what is the unit of observation (A household? A person?). Describe one or more original ideas for extending the model. Finally, include any results you may have already produced, even if they are on preliminary stages.

At 10:30a.m. on Nov 17th you will submit a rough draft of your paper. The paper must expand upon the outline, and include your best results to date. You’ll make a short, seven-minute presentation of your rough draft, using slides, later that day. Both your presentation and your draft should discuss best examples in the literature of estimating a well-defined causal effects, and your original contribution to this area. A rubric for presentations is on the last page of this syllabus.

After you receive feedback from the presentation, you will revise the rough draft and submit the final paper by 10:30a.m. on Dec 1st. All papers must have five numbered sections: 1.) Intro, 2.) Literature Review & Economic Theory, 3.) Data Description, 4.) Empirical Results, and 5.) Conclusion, as described in Stock and Watson’s “Conducting a Regression Study Using Economic Data” (on Canvas, Files > PDFs). Sections will be about five paragraphs in length and
each paragraph about five sentences. This “5x5” suggestion is a rule-of-thumb and need not be followed exactly. However, all papers must have these three tables: Variable Descriptions, Summary Statistics, and Regression Results. Original figures like maps created with GIS software are encouraged but not required; all copied tables and figures are prohibited unless cleared with the instructor. Original tables must be formatted exactly as described in class. Your paper should have seven or more references (listed in a Bibliography section) in Chicago format. All papers must list and describe an equation describing the empirical model, and must contain an abstract. As an example, a brief “letters” style article (like Holian 2020a, 2020b) is close to (though slightly shorter than) what is required here. In particular, compared to a letters article, you paper must have a whole literature review section and table of summary statistics.

Examples of Good Candidates for Replication in this Class


Term Paper Grading

For Rough Drafts and Term Papers, I’ll be looking for the things listed in the table below in each section. Of course following the guidelines of the assignment listed above is important; to repeat, all papers must have:

1.) five sections, 2.) about 25 paragraphs or 125 sentences, 3.) tables of Variable Descriptions, Summary Statistics, and Regression Results, 4.) no copied figures, 5.) References(at least seven) in Chicago format, 6.) an equation describing an empirical model, 7.) an abstract that summarizes the paper, and 8.) One or more JEL codes.

Content is most important. Remember this is a class about using observational data to estimate causal effects, so focus on discussing literature that strives to define and estimate causal effects,
evaluate how credible the estimates in the study you replicate are as causal effects, and how your extension adds to our understanding, or improves upon the replication. Grammar is also important. There are formal rules of grammar (Does each paragraph have a topic sentence? Do all sentences develop one controlling idea? Does paper feature appropriate punctuation, syntax, usage? Is the paper free of spelling errors? Are citations used appropriately?) There are also less formal “stylistic” elements of writing: Does paper avoid the passive voice? Overall, is the writing style and voice appropriate? Does it appear the student read contemporary and seminal studies and is it written in the style of the profession? The best way to learn the style of economic writing is to read economic writing; this suggests you should try to actually read the journal articles you review in your literature review section, not just the abstracts. You can also consult various guides to style and writing. In addition to the McCloskey (1985) article that will be discussed in class, a book-length treatment that is widely used across fields is Strunk (2007) The elements of style. For outlines, rough drafts and final papers, the percentages listed below each criteria are the approximate weight of each section towards your final grade. The difference between the assignments, essentially, is just the level of completeness—an outline may not feature any results, a draft will have results but the writing will be incomplete, and a final paper will be a complete academic-style term paper.

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<tr>
<th>Criteria</th>
<th>Description of Criteria for Rough Drafts and Term Papers</th>
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<tr>
<td>Intro 5%</td>
<td>Reveal the research question to the reader clearly and at the outset. Motivate interest. Describe what this paper does (i.e. how you answer the research question), the main findings, and how the paper is structured.</td>
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<tr>
<td>Literature Review and Economic Theory 40%</td>
<td>This section should describe the relevant theory that is behind the hypotheses tested in past econometric studies. You may be able to describe the theory so precisely that you include a formal mathematical model in this section, but a clear qualitative description of formal theory would be enough. Discuss at least seven econometric studies, noting which provides the most compelling estimate of the causal effect of interest. Explain why (i.e. discuss ways the state-of-the art study handles a well-defined econometric problem such as Omitted Variable Bias.) The literature review must be integrated and not merely an annotated bibliography.</td>
</tr>
<tr>
<td>Data and Methods 25%</td>
<td>Describe the data; even though I am grading it and I know where the data comes from, write it for a more general audience. Describe the estimation subsample, and present the tables of Variable Descriptions and Summary Statistics. Present the equation you will be estimating here.</td>
</tr>
</tbody>
</table>
Results 25% Present regression results in a table with several models in different columns. Indicate in the text which of the models is your best attempt at replicating the previously published model. Also indicate which is the best attempt to estimate a causal effect (this may be your extension.) Interpret the results for the reader in terms of the sign, magnitude, economic and statistical significance, as well as the implications for the theory discussed in section 2.

Conclusion 5% Overall, your paper should aim to discuss a specific causal research question that relates to a relevant economics literature. Acknowledge any limitations. Suggest directions for improvement in future research. Discuss policy implications and how your results can be used in a cost-benefit analysis, if applicable.

| Course Schedule |
|------------------|---------------------------------|---------------------------------|
| Date             | Lecture Topic                   | Check-In Readings and Dues      |
| Aug 25, 2020     | Introduction: What is Econometrics | Intro to R & Holian Ch 8 (Appendix) |
| Sep 1, 2020      | Causality and Data              | Holian Ch 1                     |
| Sep 8, 2020      | Ch1: Identification and inference | Bailey Ch 1, Team Member submission |
| Sep 15, 2020     | Ch2: Research Habits            | Bailey Ch 2                     |
| Sep 22, 2020     | Ch3: Bivariate Regression       | Bailey Ch 3                     |
| Sep 29, 2020     | Ch4: Hypothesis Testing         | Bailey Ch 4                     |
| **Oct 6, 2020**  | **Term Paper Part 1 Discussion** | Term Paper Part 1 Due           |
| **Oct 13, 2020** | Ch5: Multivariate OLS           | Bailey Ch 5                     |
| Oct 20, 2020     | Ch6: Dummy Variables            | Bailey Ch 6                     |
| Oct 27, 2020     | Ch7: Specifying Models          | Bailey Ch 7                     |
| Nov 3, 2020      | Ch10: Experiments               | Bailey Ch 10                    |
| Nov 10, 2020     | Review/Term Paper discussion    |                                 |
| Nov 17, 2020     | Student Presentations           | Term Paper Draft                |
| Nov 24, 2020     | Student Presentations           |                                 |
| **Dec 1, 2020**  | **Term Paper Due**              |                                 |