Economics 103, *Introduction to Econometrics*, Section 1, FA 15

| Instructor: | Matthew Holian, Ph.D. |
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| **Email / Phone*:** | Matthew.Holian@sjsu.edu / 408-924-1371 |
| **Office Hours* / Location:** | Tuesday and Thursdays, noon - 1:00p.m. / DMH 131 |
| **Lecture Room/ Day/Time:** | DMH 358 / Tuesdays and Thursdays / 1:30 to 2:45p.m. |
| **Lab Rooms/ Days/Time:** | DMH 236 / Tuesdays and Thursdays / 3:00 to 4:15p.m. |
| **Prerequisites:** | Econ 3 or equivalent |

*Email is my preferred form of communication. Also, during final exam week, office hours are by appointment only.

## Faculty Web Page and Canvas

Canvas is the Learning Management System at SJSU. Please be sure you can log in and are receiving my announcements by email. See my Econ 1B syllabus for information on accessing Canvas, or click https://sjsu.instructure.com/ .

## Course Description

This course is designed to give students marketable skills in core econometric analysis, while providing a survey of advanced topics in econometrics. A key structural feature of this class is designed to accomplish this: both midterms focus intensely on a relatively small amount of important topics, including estimating simple and multiple regression models, conducting hypothesis tests, and nonlinear models, while the final exam focuses rather lightly on a wide range of advanced topics, including panel data methods, qualitative choice models, experiments and quasi-experiments, instrumental variables, and time series topics. Students will also obtain data and conduct original econometric research. Lectures are Tuesdays and Thursdays from 1:30 to 2:45p.m., followed by a computer lab from 3:00-4:15p.m. Students must attend lab once a week.

## Course and Program Learning Objectives (CLOs and PLOs)

This course emphasizes two PLOs: *research methods* (ECON PLO3) and *area of specialization: quantitative methods* (PLO4d), as well as **communication** (PLO5). The five specific Course Learning Objectives for ECON 103 include: CLO 1.) Explain core methods in econometrics and identify correct procedures. CLO 2.) Discuss advanced econometric topics at a conceptual level. CLO 3.) Access data and use computer software to estimate econometric models. CLO 4.) Interpret econometric models estimated with computer software. CLO 5.) locate data, format it to be read by regression software, and develop, estimate and interpret an original econometric model to shed light on a problem of social importance. CLOs 1, 2 and 4 will be assessed with exams, CLO 3 with weekly lab assignments, and CLO 5 by term paper.

## Textbooks (* denotes recommended)

Stock, J.H. & Watson, M.W. 2011. Introduction to Econometrics. Pearson 3rd ed. (*Ask me about other editions*)

*Angrist, J. D. and Pischke, J. 2014. *Mastering Metrics,* Princeton University Press, Princeton, N.J.
(You can download the Introduction and Chapter 1, the required readings for this class, at the following link: http://press.princeton.edu/titles/10363.html )

## Required Computer Software

At a minimum, all students should have installed on their home machines 1.) A spreadsheet program, preferably MS Excel, and 2.) A statistical software package, preferably Stata. As an SJSU student, you can purchase (through www.stata.com/order/new/edu/gradplans) a six-month license for Small Stata 13 for $35.

## Assignments

Total points on all assignments sum to 100.

| Assignment | Points | Due Dates |
|---|---|---|
| Midterm and Final Exams | **60** (20 points each) | 9/22, 10/15 and 12/10 |
| Weekly Lab Assignments | **20** (1 or 2 points each) | Fridays @ 5:00p.m. |
| Term Paper | **20** (5 points for outline, 5 for draft, 5 for presentation & 5 for final paper) | Outline 10/1, Draft and Presentation 12/1, 6 or 8, Final Paper 12/18 |

Below you will find an explanation for each of these assignments.

## Midterm and Final Exams

There will be two midterms and one final exam. The midterm exams will be multiple choice and the final will be essay. For midterms, one-third of the questions will be similar to the Practice Quiz questions found here: http://wps.aw.com/aw_stock_ie_3 . Another third of the exam questions will be multiple choice questions based on the Weekly Lab Assignments. The final third will be based on things discussed in lectures and labs and on which you should have taken notes.

## Weekly Lab Assignments

The Lab Assignments are designed to give you experience using computer software and managing data. In addition, hands on experience with the data will reinforce the statistical and econometric theory and methods and thus help to prepare you for taking the exams. This is especially true given one third of the exam questions are based upon the weekly lab assignments. Points on these Lab Assignments are easy to earn; if you work on them during lab and submit them before 5:00p.m. on Fridays, you will earn full points. Late assignments are accepted for partial credit on a case by case basis. Descriptions for weekly assignments are found on Canvas

## Term Paper

Students will write a term paper focusing on a question of practical or scholarly importance. After developing a research question, and formulating a hypothesis, the main tasks involved in carrying out an applied econometric study include: identifying and downloading data from the Internet, formatting the data for analysis, analyzing the data using appropriate statistical techniques, and producing tables that summarize the data and report the results of the analysis. The term paper will also survey econometric literature that relates to the question.

Read Chapter 10 of (the brief edition) of Stock and Watson's textbook, "Conducting a Regression Study Using Economic Data," at: http://wps.aw.com/wps/media/objects/11422/11696965/stoc2517.ch10.343-350.C1.pdf  Follow the instructions detailed in this Chapter. By October 1$^{st}$ you will choose a topic, collect data, and write up an outline that contains your project's title, five sections with section names, a one sentence research question, and detailed data references. By December 1$^{st}$ you will complete a rough draft of this paper. On December 18$^{th}$ you will submit the final paper.

All papers must have five sections: Introduction, Literature Review and Economic Theory, Description of Data, Empirical Results, and Conclusion,. In addition, all papers must have the following three tables: Variable Descriptions, Summary Statistics, and Regression Results. All papers must also write out and at least one equation describing an empirical model. For an example of a paper that closely follows this format see Holian (2014).

As a set of minimal standards for regression models, it is advisable to report several model specifications (say 5 or 6) in Table 3: Regression Results. One of these specifications should contain at least four distinct variables (e.g a polynomial specification of one variable does not count as more than one), and two of these four variables must be continuous. Finally, you should estimate at least one nonlinear model, i.e. include polynomial, logarithmic, and/or interaction variables. Students who estimate a more advanced model, such as one that uses Panel Data, may earn extra credit. However, in the Conclusion, all students must critically evaluate the models they present, based on SW Ch 9.

## Course Schedule

| Date | Topic of lecture | Required Readings* |
|---|---|---|
| 20-Aug | Intro to Course | |
| 25-Aug | Intro to Empirical Economic Research | SW Ch 1, and Angrist and Pischke, Introduction |
| 27-Aug | Probability and Statistics | SW Sections 3.4 & 3.5 (review Ch 2 & 3 as needed) |
| 1-Sep | Mastering Inference | Angrist and Pischke, Chapter 1 Appendix |
| 3-Sep | Mastering Metrics and Randomized Trials | Angrist and Pischke, Chapter 1 |
| 8-Sep | Simple Linear Regression | SW Sections 4.1-4.3 |
| 10-Sep | Simple Linear Regression | SW Sections 4.4-4.6 |
| 15-Sep | Inference for Simple Linear Regression | SW Sections 5.1-5.3 |
| 17-Sep | Inference for Simple Linear Regression | SW Ch 5.4 & 5.7 |
| 22-Sep | **M I D T E R M** | **Covers SW Ch 1, Sec 3.4-3.5, Ch 4, Sec 5.1-5.4 & 5.7, & Angrist and Pischke, Introduction and Chapter 1** |
| 24-Sep | Multiple Regression | SW Sections 6.1-6.4 |
| 29-Sep | Multiple Regression | SW Sections 6.5-6.8 |
| 1-Oct | Inference for Multiple Regression    **O U T L I N E** | SW Ch 7.1-7.2 |
| 6-Oct | Inference for Multiple Regression | SW Ch 7.5-7.7 |
| 8-Oct | Nonlinear Regression Models | SW Ch 8.1-8.2 |
| 13-Oct | Nonlinear Regression Models | SW Ch 8.3-8.5 |
| 15-Oct | Nonlinear Regression Models | SW Ch 8.3-8.5 (continued) |
| 20-Oct | Review for Midterm | |
| 22-Oct | **M I D T E R M** | **Covers SW 6-8** |
| 27-Oct | Critical Evaluation of Econometric Models | SW Ch 9 |
| 29-Oct | Panel Data Methods | SW Ch 10 |
| 3-Nov | Categorical Dependent Variables | SW Ch 11 |
| 5-Nov | Categorical Dependent Variables | SW Ch 11 |
| 10-Nov | Instrumental Variables | SW Ch 12 |
| 12-Nov | Instrumental Variables | SW Ch 12 |
| 17-Nov | Experiments and Quasi-Experiments | SW Ch 13 |
| 19-Nov | Experiments and Quasi-Experiments | SW Ch 13 |
| 24-Nov | Time Series Methods | SW Ch 14 (pp. TBA) |
| 26-Nov | *Thanksgiving – No class* | |
| 1-Dec | Student Presentations | |
| 3-Dec | Student Presentations | |
| 8-Dec | Student Presentations | |
| 10-Dec | **F I N A L   E X A M**  @ 12:15p.m. | **Covers SW Ch 9-14** |

* Required readings must be completed *before* the start of class.

## Reference for further reading and links to data

To find examples of econometric research, consult the textbook's bibliography. To see many more examples of applied research, search the JSTOR database. http://library.calstate.edu/sanjose/databases/alphabetical?alpha=J, limit your search to Econ journals, and search using a keyword in your area of interest.

I wrote a blog post on data sources for term papers that students have found useful. Also, to give you some more ideas for your papers, I posting links to data sources students used in their term papers last year.:

https://www.hudexchange.info/resources/documents/ahar-2013-part1.pdf
http://www.eia.doe.gov/state/seds/
http://waterdata.usgs.gov/ca/nwis/water_use/
http://reports.weforum.org/global-competitiveness-report-2014-2015/rankings/

## University Policies

### Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes. Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

### Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

### Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.