Econometrics B
Econ 120B, Spring 2017

Course description: This course is a follow-up to the course Econ 120A. This course provides an introduction to the regression analysis frequently used in economics, business and many other areas. It deals with applications of statistical methods for testing and estimation of causal relationships can be inferred from data. The material can be challenging and the workload is substantial. However, the payoff for this course is a set of skills and analytical tools that are very useful and in high demand in the marketplace.

Learning objectives:

1. The goal is to learn enough theory and get enough practice to be able to do some simple but sensible regression analysis on your own.
2. The students should obtain the skills for basic regression analysis with real economic data.
3. The students will develop a working knowledge of Stata, an econometric software package.

Prerequisites: Econ 120A or ECE 109 or Math 180A or Math 183 or Math 186.

Course materials

Required textbook: James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 2nd Edition, Pearson. You can use other editions of the textbook if you wish, but the problem set will refer to the 2nd edition.

Required Statistical Software: Stata

1. Students are not required to buy but encouraged to buy Stata/IC version 14. Do not buy *Small* Stata, as it cannot handle large datasets.
   - This software will be used in this course and Econ 120C as well.
   - Students may order Stata online at reduced prices using GradPlan program at `http://www.stata.com/order/new/edu/gradplans/course-pricing/`
2. Students can use Stata in the computer lab in Economics Building 100, and in other computer labs on campus, such as ERC 117.
3. Students can also access Stata via the Virtual Lab. See `http://acms.ucsd.edu/students/govirtual/index.html` for more information.

Lectures: TuTh 2:00 – 3:20 (A00) and TuTh 3:30 – 4:50 (B00) at Solis Hall 104

Instructor: Dr. Munpyung O

- Office: Economics 109
- Office hours: Thursday 10:30 – 12:00 and by appointment.
- e-mail: munpyung@ucsd.edu

  Please include "**Econ 120B**" in the subject line of your email.

Discussion sections: You may attend any of the following four review sessions, regardless of which class you are registered for.

- F 10:00 – 10:50 at Peter 104
- F 11:00 – 11:50 at Peter 104
- W 4:00 – 4:50 at CSB 001
- W 5:00 – 5:50 at CSB 001

Teaching Assistants

- Liao, Yanjun, SH (Sequoyah Hall) 234, yal005@ucsd.edu
- Lopez Videla Mostajo, Bruno, SH 238, brlopezv@ucsd.edu
- Choi, Wonhyong, SH 205, woc001@ucsd.edu
- Gouin-bonenfant, Emilien, SH 236, egouinbo@ucsd.edu

Undergraduate TA (UIA)

- Wang, Zhirui, zhw099@ucsd.edu

Lectures and Discussion Sections: It is important to come to every lecture. If you should miss a class, it is your responsibility to get the notes and any information provided in class. There are weekly discussion sections for this course. You are strongly recommended to attend them since the TAs will review material covered in class and go over practice problems, the kind of problems you may encounter on exams. You will also be able to ask the TA any question about the material covered in the lectures during these discussion sections.

Problem Solving and Economics Tutoring Center (PSET): The Economics Department has made a problem solving and tutoring center available to all students in Econometrics (120ABC) on M – Th evenings and on Sunday. The ability to apply the concepts from class to solve problems is the most important skill we want you master in our core classes. PSET is designed to help you learn to tackle problems successfully by having grad and undergrad TAs there to help you think through a problem - right when you get stuck. If you struggle to tackle your homework, we believe that PSET will be an efficient and effective way for you to learn how to think like an economist. PSET hours for Econ 120B: TBA

Stata Lab and Tutorial sections: Claudio Labanca is the head TA for the Stata lab. He manages a separate set of undergraduate TAs who work in the Stata lab. During the quarter the TAs will provide tutorial sessions to facilitate the learning and use of Stata. There will 3 homework based on the 3 tutorials they will conduct in the ERC 117 lab. These TAs will also provide support for the homework assignments you will have to complete using Stata. Their office hours will be listed on TritonED on the content page. Please use the Stata lab email, statalab.ucsd@gmail.com, for any questions related to Stata and the empirical problem sets.

Stata lab tutorial schedule: You should sign up for the Stata tutorial sessions in TED.

- Week 2: Thursday 4/13 and if needed we will add sections on Tuesday 4/11.
- Week 4: Thursday 4/27 and if needed we will add sections on Tuesday 4/25.
- Week 9: Thursday 6/1 and if needed we will add sections on Tuesday 5/30.

Course web page: A course webpage is available at http://tritoned.ucsd.edu. It will include information relevant to the course, such as syllabus, problem sets, data sets and more. **You should check this page regularly**.

Problem Sets: I will periodically assign problem sets throughout the quarter. Even though they will not be collected or graded, it is VERY important to do them. The problem sets are the best way to learn and be prepared for the exams.

Exams: The midterm will be given in regular class: Tuesday, May 9th or Thursday, May 11th. The final will be given Monday, June 12, 3:00 - 6:00 for 3:30pm class (B00) and Tuesday, June 13, 3:00 - 6:00 for 2:00pm class (C00). The dates for the exams are not negotiable. You have to take the test in your section. If you have a conflict with the scheduled tests it is your responsibility to drop one of the classes. The final exam will be cumulative, but focus more on the material covered after the midterms. All tests are closed book and notes.

Makeup exams: Make-up examinations will be given only under very unusual circumstances and only if the student provides official written notification to the instructor no less than two weeks prior to the missed test. If you miss a midterm for a **justifiable** and **verifiable** reason, your midterm grade will be your grade on the final. Students who miss a test without a justifiable and verifiable reason, will most likely fail the course. No exceptions!

Grades: The overall score will be computed as follows:

- Statlab empirical problem sets: 10%
- Midterm: 35%
- A comprehensive final: 55%

The overall course grade, computed using the weights specified above, will be curved.

I reserve the right to modify these weights as needed during the semester.

Disability: If you have a documented disability, please bring your documentation to me as soon as possible so that I can make suitable accommodations for you. If you believe that you have a disability and desire accommodation, please register with the Office for Students with Disabilities.

Class conduct: Each student is expected to contribute and help to maintain a positive classroom environment conducive to learning. Do not socialize or read newspapers during class, and be sure your cell phones are turned off. No text messaging is allowed. If you must arrive late or leave early, do so quietly.

Academic Integrity: Any student found responsible for violating UCSD's academic integrity policy will earn a failing grade for the course. In addition, the Council of Deans of Student Affairs will impose a disciplinary penalty. You can find information on the university's policy on academic integrity at this website: https://students.ucsd.edu/academics/academic-integrity/policy.html

General comments

- Even if I don't explicitly assign reading from the text, it is a good idea to read the chapter before coming to class in order to have some understanding of the concepts to be presented.
- ***This class moves rapidly***. *Cramming* is not an effective way to learn this material. A student who keeps up with the topics as they presented will find the course much more enjoyable and will master the concepts more quickly.
- Attend all lectures. You are responsible for any information given during lectures.
- Please do use my office hours for everything related to the content of the course. If you have doubts about the materials, do not wait until a few hours before the exam.
- Students are encouraged to ask questions in class. You've probably heard this before, but if you have a question, chances are that others in the class have the same question.
- Finally, ask questions before, during, or after class or come to my office if you having any trouble with the course material. Remember the goal of education is to learn, not to suffer!

Course content and schedule (Changes, if any, will be announced in the class.)

The following course schedule should be considered extremely tentative, and will likely change depending on our pace through the quarter. I reserve the right to modify this schedule as needed during the quarter.

0. Introduction and a brief review of Econ 120A (Chapter 1 - 3)
   1) Random variable and its characterization
   2) Sampling distribution, sample statistics: Standard deviation and Standard error
   3) Estimation, good estimation (BLUE)
   4) Test: Sample bias vs sample error
   5) Covariance, correlation, regression, causality, the notion of Ceteris Paribus
   6) Data, the structure of economic data

1. Simple Regression (One regressor) (Chapter 4 and 5)
   1) Assumptions
   2) Estimation: OLS, MOM, MLE - without calculus, intuition only
   *3) Geometry of Regression: Conditional expectations, projection
   4) Statistical and economic interpretation estimated coefficients, R-squared
   5) Regression through the origin(RTO), data scaling, log variables
   6) Testing statistical significance of a single parameter: t- test
   *7) ANOVA basics

2. Multiple Regression: Estimation (Chapter 6)
   1) Sampling distribution of the OLS estimators
   2) Efficiency of OLS: The Gauss-Markov theorem
   3) Confidence intervals
   4) Testing statistical significance of a group of parameters: F-test

3. Multiple Regression: Inferences (Chapter 7)

1) Sampling distribution of the OLS estimators
2) Efficiency of OLS: The Gauss-Markov theorem
3) Confidence intervals
4) Testing statistical significance of a group of parameters: F-test

4. Topics in Multivariate Regression (Chapter 8 and 9)
   1) Dummy variables
   2) Modeling nonlinear functions
   3) Source of OLS bias: measurement error, omitted variable, simultaneity and sample selection.