

Syllabus

Economics 424: Computer Methods in Economics

Instructor: (Daisy) Weijia Dai

Winter 2012

Monday to Thursday: 1:00 - 4:15 PM

LeFrak Hall (LEF) 0229

Goal

As a first step to applied econometrics, Econ 424 introduces the most basic data handling techniques in economic studies. The ultimate goal is three-fold, at the end of the semester, students should be able to:

- use a real data set to generate basic statistics and interpret them in a way that makes statistical and economics sense;
- read and interpret statistics generated by other people;
- use simulations to study and understand statistical phenomena.

In order to fulfill this goal, all classes, including mid-term and final, will meet in a computer lab and use two popular statistical software – Excel and STATA. Through the hands-on experience, students are expected to master both softwares at the introductory level and apply them to economic issues in the real world.

Prerequisites

Eligible Students must major in Economics and have completed Econ 305 (Intermediate Macroeconomics Theory and Policy), Econ 306 (Intermediate Microeconomics Theory) and Econ 321 (Economic Statistics). We will devote classes to introduce Excel and STATA, so experience with either software is not required. However, if you need extra help in getting started, please contact me as soon as possible.

Recommended reference books

The class will follow lecture notes instead of textbook. The most updated lecture notes will be available before the lecture. However, if you want published books as reference, you may consider:

Christopher F. Baum, “An Introduction to Modern Econometrics Using Stata”, published by Stata Press. ISBN-13: 978-1-59718-013-9. <http://www.stata.com/bookstore/imeus.html>

This STATA books won't be relevant until the second half of the course.

Evaluation

Grades for the course will be based on:

- a total of six in class exercises (12 percent total);
- a total of four homework assignments (12 percent total);
- one project (11 percent total);
- one mid-term exam (30 percent);
- one cumulative final exam (35 percent);

The in class quiz are due at the end of class and cannot be made up. In class quiz are graded as check (2 points), check minus (1 point), or not complete (0 point).

The homework assignments are small and are assigned in class and due at the start of class on the due date. The homework assignments are graded as check plus (3 points), check (2 points), check minus (1 point), or not complete (0 point).

The project is a larger assignment designed to let you use what you are learning on a larger scale example. This should solidify how you can use what you are learning in class to answer economics questions that interest you.

The format of empirical questions of the homework and the project is an outline of questions to answer. Your responses should be in the form of brief narratives that describe your results and conclusions. You should hand in your output files (Excel or Stata) only when requested. Think of the assignments as requests for information from your boss. Once you get the answers, you have to communicate them clearly to your boss, though you do not need to provide a lot of context for the questions, because the boss already knows the context.

Please attempt to complete assignments on your own before talking to your peers. Each student must turn in their own assignment. All of the text and all results and included calculations for the assignment must be *written by each student separately*, even if you work together to get results.

Late assignments

As a general rule, I will not accept late assignments, and in class assignments cannot be made up. I will make exceptions to this rule per the University of Maryland's policy on excused absences.

Class attendance

This class is taught in a computer lab because hands-on experience is very important for learning this material. You should plan on attending class regularly. If you miss a class, you can download the lecture notes, consult your classmates, or contact me via email or during my office hours.

Hands-on teaching is much more effective than remote communication by emails. If you miss a class, you can download the lecture notes or consult your classmates. If you still have questions after reading the lecture notes, you are welcome to contact us via email or in person. Please don't expect the instructor to re-lecture every point covered in the missed class.

Important Dates

Tuesday, January 3: First day of class
Tuesday, January 10: Midterm exam (in class)
Monday, January 23: Final exam (in class)
Tuesday, January 24: Final project due (1:00 PM)

Outline

Date	Topic and Concepts	Programming Skills
Jan 3 (Tue)	<p><i>Course introduction</i></p> <ul style="list-style-type: none"> - course outline and purpose - requirements and evaluation <p><i>Data description</i></p> <ul style="list-style-type: none"> - mean, order statistics, variance, skewness - histogram and relative frequency polygon 	<p><i>Clean raw data in excel</i></p> <ul style="list-style-type: none"> - text to column, referencing cells - sort data <p><i>Describe data in excel</i></p> <ul style="list-style-type: none"> - general statistics - making histogram <p><i>Getting Excel help</i></p>
Jan 4 (Wed)	<p><i>Review of probability theory</i></p> <ul style="list-style-type: none"> - sample versus population - discrete and continuous random variable distributions - expected values, moments, - central limit theorem and its applications <p><i>Common distributions</i></p>	<p><i>Simulation</i></p> <ul style="list-style-type: none"> - simulate binomial, uniform, normal, χ^2, t distributions - show central limit theorem
Jan 5 (Thur)	<p><i>Estimation and Inferences</i></p> <ul style="list-style-type: none"> - distribution of a random sample - estimator for mean and variance - confidence interval 	<p><i>Hypothesis test in excel</i></p> <ul style="list-style-type: none"> - hypothesis test functions - confidence interval functions
Jan 9 (Mon)	<p><i>Hypothesis testing</i></p> <ul style="list-style-type: none"> - Null hypothesis versus alternatives - Type I and Type II errors - testing of two samples 	<p><i>Exercise of hypothesis test</i></p> <p><i>Excel Review</i></p>
Jan 10 (Tue)	<p>Midterm Exam</p> <p><i>Getting started with Stata</i></p> <ul style="list-style-type: none"> - computer programming basics 	<p><i>Getting started with Stata</i></p> <ul style="list-style-type: none"> - data type - control structure
Jan 11 (Wed)	<p><i>Regression theory</i></p> <ul style="list-style-type: none"> - questions regressions can and cannot answer - interpreting regression coefficients - inferences of regression coefficients - t-test, F-test, goodness of fit 	<p><i>Stata exercise</i></p> <ul style="list-style-type: none"> - load and browse data - check cleanness of data - scatter plot, line plot
Jan 12 (Thur)	<p><i>Stata Basics</i></p> <ul style="list-style-type: none"> - More on data cleaning - Describe and visualize data - Data type <p><i>Getting started on final project</i></p>	<p><i>Clean data in Stata</i></p> <ul style="list-style-type: none"> - use conditions <p><i>Describe data in Stata</i></p> <ul style="list-style-type: none"> - sort data - summarize data - plot data

Jan 17 (Tue)	<i>More on regression theory</i> - multivariate regression - classical assumptions of OLS - violation of classical assumptions and solutions	<i>Working with multiple data sets</i> - append data - merge data - sort data
Jan 18 (Wed)	<i>More on regression theory</i> - regression examples - testing linear restrictions	<i>Regression in Stata</i> - generate dummy variables - regression command - understanding and interpreting regression outcome - export regression result
Jan 19 (Thur)	<i>Review</i>	<i>Stata regression examples</i>
Jan 23 (Mon)	<i>Final Exam</i> <i>Final project discussion</i>	