

Econ 513: Practice of Econometrics

Fall 2014

Department of Economics, USC

Instructor

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Course Description

This course is an introduction to the measurement of economic relations, i.e., relations between economic variables. Such relations are useful to assess the effect of a single variable holding other variables constant, the type of effect that economic theory informs us about. They can also be used to obtain the causal effect of a policy. Economic relations are also useful in prediction. We show how the tools of statistics that are designed to analyze outcomes of random experiments can be used to make inferences on relations that are not stochastic. We consider linear relations first and develop the estimation and inference methods for such relations. An issue that comes up frequently in empirical economic (and general social science) research is that variables that affect an outcome are not chosen at random. We discuss various approaches to dealing with the resulting bias. Finally we also consider nonlinear relations, in particular the relation between a discrete outcome and determining variables.

Lectures 1–8 are a review of the multiple linear regression model using matrix notation. Lectures 9–13 introduce asymptotic and bootstrap inference in this model. In lectures 14–23 we consider econometric methods that allow us to distinguish correlation and causation. Lectures 24–28 consider discrete outcome models that are closer to economic theory. For these models we also need to discuss nonlinear estimation. Throughout, results are illustrated with empirical examples.

Course Organization

Lectures are twice a week, on Tuesdays and Thursdays 4:00pm–5:50pm in VPD 105. Besides the lectures, there will be assignments that involve data analysis. We will support Stata that is available on the USC network. The TA will organize a session in the computer lab to give an introduction to Stata. The data can be downloaded from the course site.

Lectures

Date	Day	Lecture	Topic
08/26/2014	Tuesday	1	Introduction
08/28/2014	Thursday	2	Ordinary Least Squares (OLS) in matrix notation
09/02/2014	Tuesday	3	Properties of the OLS solution
09/04/2014	Thursday	4	Projections and partitioned regression
09/09/2014	Tuesday	5	Linear regression as a statistical model
09/11/2014	Thursday	6	Assumptions in the classical linear regression model
09/16/2014	Tuesday	7	Sampling distributions
09/18/2014	Thursday	8	Statistical inference with normally distributed disturbances
09/23/2014	Tuesday	9	Average partial effects and projections
09/25/2014	Thursday	10	Statistical inference in large samples: asymptotics
09/30/2014	Tuesday	11	Asymptotic inference for the OLS estimator
10/02/2014	Thursday	12	Monte Carlo simulation and the bootstrap
10/07/2014	Tuesday	13	Bootstrap inference for the OLS estimator
10/09/2014	Thursday	–	<i>Midterm</i>
10/14/2014	Tuesday	14	Instrumental Variables (IV)
10/16/2014	Thursday	15	Statistical properties of IV estimators
10/21/2014	Tuesday	16	Panel data and pooled OLS
10/23/2014	Thursday	17	Random effects and Generalized Least Squares (GLS)
10/28/2014	Tuesday	18	Fixed effects and the within estimator
10/30/2014	Thursday	19	First differencing and comparisons of estimators
11/04/2014	Tuesday	20	Estimating the effect of a policy change: differences-in-differences (DID)
11/06/2014	Thursday	21	Panel data, clustering, and DID
11/11/2014	Tuesday	22	Nonparametric regression
11/13/2014	Thursday	23	Regression discontinuity (RD)
11/18/2014	Tuesday	24	Maximum likelihood (ML)
11/20/2014	Thursday	25	Numerical and statistical properties of ML estimators
11/25/2014	Tuesday	26	Binary response models
11/27/2014	Thursday	–	<i>Thanksgiving recess</i>
12/02/2014	Tuesday	27	Discrete choice and the Additive Random Utility Model
12/04/2014	Thursday	28	Multinomial logit and alternative discrete choice models

Prerequisites

Some background material will be briefly reviewed in the first few weeks of the course, but we recommend that you become familiar (or renew the acquaintance) with matrix algebra. We assume that you know basic matrix operations, such as multiplication and inversion. We also assume that you have some knowledge of statistics and that you know what an estimator, a confidence interval and a test is.

Textbook and Additional Literature

You need to have at least one advanced econometrics text as a reference book. The preferred book is

Jeffrey M. Wooldridge (2010), *Econometric Analysis of Cross Section and Panel Data* (2nd ed.), MIT Press.

This book is quite advanced and the treatment in the lectures will generally be a bit less technical, especially in the first half of the course. Some background material that supplements this book will be discussed in the lectures. The slides will be made available on the course web site.

If you have another book that you think covers the material in this course, please consult me. In general, undergraduate textbooks do not cover the material at the level of this course.

Exams and Grading

Midterm: In class, Thursday, October 9.

Final: The date of the final is set by the College (Thursday, December 11, 4:30pm–6:30pm).

Homework: Five assignments (made available on Thursdays: 09/11, 09/25, 10/23, 11/06, 11/20). The assignments will involve empirical work where you will use Stata that is available on the USC network. An introduction to Stata will be provided. You must hand in all assignments to pass this course.

Grading: Grades will be based on assignments (20%), a midterm (40%), and a final examination (40%).

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30am–5:00pm, Monday through Friday. The phone number for DSP is (213) 740-0776.