ECON 60302: Econometrics 1

Professor B.J. Lee — Fall 2022
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Course Description

This course is the first sequence of a two-semester Ph.D. course of econometrics. This course focuses on the basic statistics and econometric theory with computer applications. This course covers most of the traditional econometrics techniques starting from the simple and multiple linear regression models to the maximum likelihood estimation and instrumental variables estimation method.

This course assumes that students have some background knowledge of statistical theory and matrix algebra. The purpose of this course is to provide working knowledge of econometrics for non-econometrics Ph.D. students.

Course Materials

1. Probability and Statistical Inference, R. Hogg and E. Tanis, 2010, 8th ed., **Recommended.**
2. Econometric Analysis, W.H. Greene, Pearson, 2018, 8th ed., **Recommended.**
3. Econometric Theory and Methods, Davidson and MacKinnon, Oxford Press, 2004, **Recommended.**
4. Lecture Notes in the Google Drive.

My lecture will follow my own lecture notes with similar chapters in the textbooks. These books are the typical first-year graduate statistics and econometrics textbooks widely used in the major economics departments.

Prerequisite

1. Undergraduate level of economic statistics
2. Knowledge of matrix algebra

Grading

Two exams (one midterms and one final) are counted equally for the final grade (40% each). Weekly homework assignments are worth the remaining 20%.

Academic Honor Code: The Code of Honor will be strictly applied as described in The Academic Code of Honor Handbook.

Honor Code pledge reads "As a member of Notre dame Community, I will not participate in or tolerate academic dishonesty." Consult Notre Dame Academic Code of Honor web page, http://www.nd.edu/~hnrcode/docs/handbook.htm for detailed description. Students will not give or receive aid on exams. This includes, but is not limited to, viewing the exams of others, sharing answers with others, and using books or notes while taking the exam. You can collaborate to study your homework, but you have to submit your own completed homework to receive appropriate credit. Copying solutions from others, whether or not they are currently in the course, constitutes plagiarism.

Computer Programs

You need to learn computer programs to handle the statistical problems presented in this course. There are several good statistical software programs available in the Notre Dame network (Eviews, Matlab, SAS, SPSS, Stata, etc). Matlab is a programming language widely used in mathematical and statistical computing. It is a matrix based program and very intuitive to learning econometric theory. Stata is another widely used program in econometrics, and it is a ready-made statistical program. Python is another popularly used program language in the scientific community. Unlike Matlab and Stata, Python is publically available and free to install for personal use. Anaconda (from anaconda.com) is a complete package of Python. Python is very useful for various financial econometrics applications. It is strongly recommended that you get familiar with both Matlab and Stata, so that we can make best use of econometric theory into empirical applications. All of these programs are available in Notre Dame network. If you are not familiar with Matlab, there are couple of good Matlab introductory books.

- Getting Started with Matlab 7, Rudra Pratap, Oxford University Press, 2006
- Matlab Primer, T.A. Davis and K. Sigmon, Chapmann & Hall/CRC, 2005

We will use the data from the textbook to do various econometric exercises. The data is available in the Google Drive.

Tentative Course Schedule: Chapters follow from W. Greene (G), 8th ed, and my lecture notes (LE: econometrics, LS:statistics, and LT:time-series).

Chapter	**Contents**	**Week**
G1 (LE1)	Introduction	1
G2 (LE2)	Classical Multiple Regression Model	1-2
G3 (LE2)	Least Squares	2-3
G4 (LE3)	Statistical Properties of Least Squares Estimator	4
G5 (LE4)	Inference and Prediction	5
G6 (LE5)	Functional Form and Structural Changes	6
G5.8 (LE6)	Specification Analysis and Model Selection	7
G7 (LE8)	Nonlinear Regression Models	8
	Midterm Exam (October 12, 2022)	8
	Fall Break	
G14 (LE7)	Maximum Likelihood Estimation	9
G9 (LE9)	Generalized Regression Model and Heteroskedasticity	9-10
G8 (LE10)	Instrumental Variable Estimation	10
G11 (LE13)	Models for Panel Data	10-11
G10 (LE14)	System of Regression Equations	11
G20 (LE12)	Serial Correlation	12
G21 (LT3)	Nonstationary Time-series Model	13
G18 (LE15)	Discrete Choice Models	14
G19 (LE16)	Tobit Model: Censored and Truncated Regressions	15
		15
cumulative	**Final Exam**	16