Economics 558a: Statistics and Econometrics

Fall 2000

Instructor: Dr. Hanming Fang, Room 28, 37 Hillhouse.

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Time and Location: MW 9:00-10:20am, Room 200 12 Hillhouse Avenue

Homepage: http://pantheon.yale.edu/~hf54/teaching/teaching.html

Office Hours: Mondays 3:15 - 5:15pm and by appointment

Teaching Assistant: TBA

Textbook:

1. [G] Damodar Gujarati, Essentials of Econometrics, Second edition, Irwin/McGraw-Hill, 1999.
2. [B] Ernest R.Berndt, The Practice of Econometrics: Classic and Contemporary, Second edition, Addison-Wesley Publishing. 1996

Course Description:

This course provides students with knowledge of statistical and econometric methods with an emphasis on applications on quantitative analysis. It begins with basic probability and statistics, including random variables, probability distributions, mathematical expectations and basic sampling theory. It proceeds to cover classical linear regression model and introduce estimation methods such as ordinary least squares, weighted least squares, maximum likelihood. Data and computer software package are an integral part of this course. Computer-oriented exercises that uses real data are required.

Grading: There will be assignments, a midterm exam and a final. They will count toward the grade as follows.

Assignments	20%
Midterm	40%
Final	40%.

Course Outlines

Part I: Probability and Statistics

1. Introduction [G, Chapter 1]
    - Nature of Statistics and Econometrics
    - Methodology of Econometrics
2. Basics of Probability and Statistics
    - Sample Space, Probability Measure, Events [G, Chapter 2.2]
    - Random Variables (Discrete, Continuous and Mixed) [G, Chapter 2.3]
    - Probability Distributions (univariate and multivariate) [G, Chapters 2.5, 2.6]
    - Important Distributions (Normal, Chi-Square, t; F) [G, Chapter 3]
    - Mathematical Expectations [G, Chapter 2.7]
    - Independence [G, Chapter 2.7]
3. Elements of Sampling Theory [G, Chapter 2.8]
    - Random Sampling
    - Distribution of Sample Statistics
    - Law of Large Numbers and Central Limit Theorems [Supplement]
4. Statistical Inference: Estimation and Hypothesis Testing [G, Chapter 4]
    - Point Estimation
    - Consistency and E¢ciency of Point Estimates
    - Hypothesis Testing: Null and Alternative Hypothesis
    - Type I and Type II Errors
    - Hypothesis Testing using Con…dence Interval
    - Hypothesis Testing using Test of Signi…cance

Part II: Linear Regressions

5. Ordinary Least Squares [G, Chapter 5; B, Chapter 2, 3]
    - The Meaning of Regression
    - The Derivation of OLS Estimates
    - Properties of OLS Estimates

- Hypothesis Testing
- Dummy Variable [B, Chapter 5]

6. Issues in Linear Regressions

   - Multicollinearity [G, Chapter 10]
   - Heteroscedasticity [G, Chapter 11]
   - Autocorrelation [G, Chapter 12]
   - Logit, Tobit, Probit and Maximum Likelihood [G, Chapter 14.5; B, Chapter 11; supplement]

Part III: Simultaneous Equation Models

7. Simultaneous Equation Models [G, Chapter 15; B, Chapter 8, 9, 10]

   - Simultaneous Equation Bias: Inconsistency of OLS
   - Identi…cation
   - Method of Indirect Least Squares
   - Instrumental Variable and 2SLS