

Topics in Econometrics

Class: Mon. & Wed., 10:30a-11:50a, Rosenwald 301

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Prerequisites:

Students should be familiar with basic probability and statistics, including elementary large-sample theory. Familiarity with measure-theoretic probability will be useful.

Required Textbook:

There is no required textbook, but I may draw material from the following sources, all of which I recommend for students interested in doing research in econometrics and mathematical statistics:

1. *Testing Statistical Hypotheses* (2005) by Lehmann and Romano
2. *A User's Guide to Measure-Theoretic Probability* (2002) by Pollard
3. *Convergence of Stochastic Processes* (1984) by Pollard
4. *Asymptotic Statistics* (2000) by van der Vaart
5. *Weak Convergence and Empirical Processes* (1996) by van der Vaart and Wellner

6. *Subsampling* (1999) by Politis, Romano and Wolf

Grading:

There will be a few problem sets throughout the quarter. There may be student presentations and/or a final exam. I have not decided at this point.

Course Topics:

A tentative list of topics that we will cover is listed below. There may be additions and deletions. Note that many of these topics could be entire courses in and of themselves, so our coverage will necessarily be incomplete.

1. Identification in Econometrics
 - (a) Definition of (Partial) Identification
 - (b) Identification in the Linear Model
 - (c) Identification a Binary Response Model
2. Asymptotic Comparisons of Tests
 - (a) Local Asymptotic Power
 - (b) Comparison of the Sign Test and t -test
 - (c) Contiguity and the Wilcoxon Signed Rank Test
 - (d) Asymptotically Normal Experiments
3. Asymptotic Comparisons of Estimators
 - (a) Superefficiency and Hodges' Estimator
 - (b) Efficiency of Maximum Likelihood Estimators
4. Uniform Laws of Large Numbers
 - (a) The Glivenko-Cantelli Theorem
 - (b) Some Generalizations

5. The Bootstrap
 - (a) The Nonparametric Mean
 - (b) The Nonparametric Median
 - (c) Counterexamples
6. Subsampling
 - (a) The Main Result
 - (b) Comparisons with the Bootstrap
7. Uniformity
 - (a) Pointwise versus Uniform Consistency in Level
 - (b) The Bahadur-Savage Result
8. Randomization Tests
 - (a) Finite-Sample Results
 - (b) Asymptotic Behavior of Randomization Tests
9. Multiple Testing
 - (a) The Familywise Error Rate
 - (b) Single-Step Procedures
 - (c) Stepwise Procedures
 - (d) Generalized Error Rates