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Introduction to Applied Econometrics I - course outline

This course provides an introduction to applied econometrics. The target audience is Kellogg graduate students interested in quantitative research. The main focus of the course is to provide students with the necessary quantitative skills to (a) read and criticize published research articles (b) conduct independent quantitative research for papers and dissertations (c) progress to more advanced quantitative courses. The prerequisite for the course is at a minimum an undergraduate introductory class in statistics (or equivalent). Rudimentary knowledge of linear algebra is also required (matrix algebra will be covered/reviewed in class). While the course will provide the appropriate theoretical background for the topics covered, the main approach is "hands-on", i.e., application-oriented.

Course Materials: The recommended text book for the class is *Econometric Analysis*, William H. Greene, 7th edition, Prentice-Hall, 2010. You are welcome to use earlier versions, although the newest version includes good updates. For the reading list, I list the relevant page numbers in version 5 through version 7 of the textbook for your information. The text book will be supplemented by lecture notes and articles.

Lectures: We will meet on Wednesdays, 2:15-5:15pm in G-42.

Week 1 Introduction:
Readings: Appendix B

1. Introduction to Econometrics
2. Software and computers
3. Review of probability (random variables, distributions, moments)

Week 2 Review of Statistics:
Readings: Appendix C, Chapter 1, V5: Chapter 17, p.468–482; V6: Chap 16, p482-496; V7: Chap 14, p509-524.

1. Review of basic statistics (estimators, properties of estimators)

Week 3 General Estimation Theory:
Readings: V5: Ch 16, p.425–429; Ch 17, 468–484; V6: Skim Ch 14, Ch 15 p428-451, Ch 16 p482-497; V7: Chap 12, Ch 13, p455-479, Chap 14, p509-524

1. Method of Moments
2. Maximum Likelihood
3. GMM

Week 4 The Linear Model I:
Readings on Linear Models, weeks 4-6: Ch 2, 3 and 4

1. The Simple Linear Regression Model
2. Assumptions
3. OLS

Week 5 The Linear Model II:
Readings: Appendix A

1. Review of Matrix Algebra
2. Assumptions of the Linear Model
3. OLS

Week 6 The Linear Model III:

1. Practical Aspects/Implementation of OLS
2. Inference
3. Applications

Week 7 The Linear Model IV:
Readings: V5: Ch 10-12; V6: Ch 8, 19; V7: Ch 9 and 20.

1. Specification testing
2. Failure of Model Assumptions (multicollinearity, heteroscedasticity, autocorrelation)
3. Heteroscedastic Consistent Standard Errors
4. GLS
5. Applications

Week 8 Multivariate Analysis
Readings: V5: Ch 14; V6 and V7: Ch 10

1. The SURE Model
2. Factor Analysis
3. Endogeneity Concerns
4. Applications

Week 9 Endogeneity and Causal Inference:
Readings: V5: Ch 5.4-5.5; V6: Ch 12; V7: Ch 8.

1. Identification of Causal Effects

2. Instrumental Variables
3. Introduction to System Estimation (2SLS)
4. Matched Sampling
5. Applications

Week 10 Panel Data
Readings: V5: Ch 13; V6: Ch 9; V7: Ch 11.

1. Introduction to Panel Data
2. Simple Panel Data Estimators