

THE UNIVERSITY OF ILLINOIS AT CHICAGO
ECON 534: Econometrics I
AUTUMN 2011

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Office Hours:
Thu, 1:00-2:00
or by appointment

Required Text:

W.H.Greene. *Econometric Analysis*, 7th edition, Prentice Hall, 2012 (mostly theoretical, very comprehensive and current, intermediate/advanced level).

Other Recommended (Optional) Texts:

R.Davidson and J.G.MacKinnon. *Econometric Theory and Methods*, Oxford University Press, 2004 (mostly theoretical, very well organized, up to date, advanced level).

H.H.Stokes. *Specifying and Diagnostically Testing Econometric Models*, 2nd Edition, Quorum, 1997 (applied, many useful examples and models, intermediate level).

G.G.Judge, W.E.Griffiths, R.Carter Hill, H.Lütkepohl, T.-C.Lee. *The Theory and Practice of Econometrics*, 2nd edition, Wiley, 1985 (theoretical, very extensive coverage of topics, intermediate/advanced level)

J.D.Hamilton. *Time Series Analysis*, Princeton, 1994 (mostly theoretical, excellent time series coverage, advanced level).

F.Hayashi. *Econometrics*, Princeton, 2000 (mostly theoretical, very current, organized around GMM theme, advanced level).

J.M.Wooldridge. *Econometric Analysis of Cross Section and Panel Data*, MIT Press, 2002 (theoretical, intermediate/advanced level, focus on microeconomic research).

T.Amemiya. *Advanced Econometrics*, Harvard, 1985 (purely theoretical, advanced level).

H.White. *Asymptotic Theory for Econometricians*, Academic Press, 1984 (purely theoretical, very advanced level).

Overview:

This is the first course of the graduate sequence in Econometrics. Its purpose is to deal with a broad survey of topics about estimation, diagnosis, and inference in single-equation econometric models (multi-equation models will be covered in Econ 535).

Part I is a quick introduction to the nature of econometrics and the basic elements of probability and statistics. Part II introduces the classical model, discusses its bivariate and multivariate versions, and deals with issues of testing and specification. Part III extends the discussion to the topics of asymptotic theory and non-linear estimation. Finally, Part IV focuses on the generalized model and, in particular, on the issues of heteroskedasticity, serial correlation, and, if time permits, the treatment of panel data sets.

Evaluation: Your grade will be based on a midterm (40%), a final (40%), and a set of homeworks (20%). In addition, there will be at least two practice problem sets.

Course Outline:

I. INTRODUCTION

1. The Nature of Econometrics
2. Digression: Elements of Probability and Statistics: Probability Density Functions, Expectations, Some Useful Distributions, Joint and Conditional Distributions, Statistical Independence. (Appendix B)

II. THE CLASSICAL MODEL

3. The Bivariate Regression: Ordinary Least Squares Estimator, Properties, Inference, Hypothesis Testing. (class notes)
4. Digression: Elements of Matrix Algebra: Basic Properties, Characteristic Roots and Vectors, Quadratic Forms. (Appendix A)
5. The Multivariate Model: The Classical Assumptions, Ordinary Least Squares Estimator, Properties, Goodness of Fit, Hypothesis Testing, Maximum Likelihood Estimator and its Properties. (chapters 2, 3, 4, and 14)
6. Hypothesis Testing and Predictions: Testing Linear Restrictions, Estimation Subject to Linear Restrictions, Structural Change Tests, Prediction. (chapters 5 and 6)
7. Specification and Data Problems: Dummy Variables, Multicollinearity, Omitted Variables Bias, Irrelevant Variables Included. (chapters 6 and 7)

III. SOME USEFUL EXTENSIONS

8. Digression: Elements of Asymptotic Theory: Convergence in Probability, Convergence in Distribution, Law of Large Numbers, Central Limit Theorem, Other Useful Theorems and properties. (Appendix D)
9. Asymptotic Theory in the Classical Model: Stochastic Regressors, Consistency of OLS estimator, Asymptotic Distribution of OLS, Hypothesis Testing, Measurement Error. (chapter 4)
10. Non-Linear Estimation: Extremum Estimators, Non-Linear Least Squares, Maximum Likelihood, GMM, Hypothesis Testing. (chapters 7 and 14)

IV. THE GENERALIZED MODEL

11. Generalized Least Squares: Properties of OLS estimator, the GLS estimator, Feasible GLS, Maximum Likelihood. (chapters 9 and 14)
12. Heteroskedasticity: Properties of OLS estimator, GLS and Feasible GLS, Tests for Heteroskedasticity. (chapter 9)
13. Time Series Topics and Serial Correlation: Stationarity and Unit Roots, Properties of OLS and Spurious Regressions, Tests for Serial Correlation, Consistent Estimation. (chapters 20 and 21)
14. Panel Data: Properties of OLS, Fixed Effects, Random Effects. (chapter 11)