

Econ 672
Econometrics II
Spring 2004

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Class Meetings: MTWRF 10-11:00 am, Heady 272

A. Course Objectives:

This course is a continuation of the standard graduate curriculum in econometrics. The course provides a systematic approach to econometric theory and techniques associated with single and multiple equation econometric models, with special emphasis on qualitative and censored data, panel data, multiple endogenous variables, and time-series data. The emphasis will be to provide an intuitive, yet rigorous, theoretical understanding of the statistical methods used to analyze such data and models. There will be “hands on” experience using statistical software and actual data analysis. The course will provide students with exposure to selected empirical applications.

The student should be able to apply econometric tools to a wide range of economic problems. There will be regular exercises that allow the student to develop skills in formulating and estimating models. Some exercises will be analytical in nature, while others will involve estimation of models and interpretation of results.

B. Grading:

Homework and classroom participation	20%
Midterm	35%
Final Exam	45%

C. Textbooks:

Required text: Greene, W. H. *Econometric Analysis*, 5th Ed., Prentice Hall, 2003.

Recommended: Woolridge, J. *Econometric Analysis of Cross Sections and Panel Data*. Cambridge MA: The MIT Press 2002.

Other sources: Davidson, R. and J. MacKennon. *Econometric Theory and Methods*, New York, NY: Oxford University Press, 2004.

Ruud, P.A. *An Introduction to Classical Econometrics*, Oxford University Press, 2000.

Econ 672
Syllabus

- I. Qualitative and censored dependent variable model
 - A. Discrete dependent variable
 - Linear probability model
 - Probit model
 - Logit model
 - B. Limited dependent variable and non-random sample selection models
 - Tobit model
 - Non-random sample selection effects
 - Heckman's method
 - Other methods
 - C. Duration models: Waiting time or Hazard functions
- II. Properties of estimators and M-estimation
 - A. Large Sample
 - Convergence in probability
 - Limiting distributions
 - Convergence in distribution.
 - Asymptotic distributions
 - B. M-estimators
- III. Estimating Systems of Equations by OLS and GLS
 - Multivariate Linear Model
 - Seemingly unrelated regressions (SUR)
 - Linear unobserved effects in panel data
- IV. Stochastic regressors and systems of regression equations
 - A. General issues and identification in simultaneous equation models (SEM)
 - Rank and order conditions
 - Methods to achieve: normalization, identities, restrictions on coefficients and covariances
 - B. Estimation
 - Single equation: IV, 2SLS
 - Systems of equations: 3SLS, FIML
 - C. Testing—generally and for endogeneity/exogeneity
 - D. Forecasting in SEM
- V. Time-Series Models
 - A. Definitions and examples of stationary time-series models
 - 1. General processes
 - Autoregressive, AR(r)
 - Moving average, MA(s)
 - Autoregressive—moving average, ARMA(r,s)
 - 2. Covariance stationarity
 - Meaning
 - Fitting models
 - B. Nonstationary time-series models
 - 1. Models
 - Definition
 - Importance
 - Fitting
 - 2. Testing
 - Unit root (Dickey-Fuller and others)
 - Methods to induce stationarity (differencing, structural breaks)
 - Spurious regressors
 - Cointegration
 - C. Forecasting with time-series models

I. Qualitative and Censored Dependent Variables

A. Discrete dependent variable models

Greene, W. H. *Econometric Analysis*, Ch 21, pp 663-755Wooldridge, J. *Econometric Analysis of Cross Section and Panel Data*, MIT Press, 2002, Ch 15, pp 451-516.Ruud, P. A. *Classical Econometric Theory*, Ch 27, pp 747-790Amemiya, "Qualitative Response Models: A Survey," *J. Econ. Lit.* 19(Dec 1981):1483-1536Application: (i) Horowitz, J. H. and N. E. Savin, "Binary Response Models: Logits, Probits and Semiparametrics," *J. Econ Perspectives* 15(Fall 2001):43-56(ii) Catsiapis, "A Model of Educational Investment Decisions," *Rev Econ Statistics* 69(1987):33-41

B. Limited dependent variable, censored regression and nonrandom selection

Greene, W. H. *Econometric Analysis*, Ch 22, pp 756-802Wooldridge, J. *Econometric Analysis*, Ch 16-17, pp 517-602Ruud, P. A. *Classical Econometric Theory*, Ch 28, pp 791-830Application: (i) Pitt, M. "Farm Level Fertilizer Demand in Java: A Meta Production Function Approach," *Amer. J. Agr. Econ* 65(Aug 1983):502-508(ii) Chey, K. C. and J. L. Powell, "Semiparametric Censored Regression Models," *J. Econ Perspectives* 15(Fall 2001):29-42

C. Duration Models

Wooldridge, *Econometric Analysis*, Ch 20, pp 685-737.Application: Neuman, G.R. Search Models and Duration Date," in M.H. Persaran and P. Schmidt, eds., *Handbook of Applied Econometrics, Vol II: Microeconometrics*. Malden, MA: Blackwell Publishing (Fall 2000):300-351.**II. Large Sample Properties of Estimators and M-estimators**Greene, W. H. *Econometric Analysis*, Ch 5, pp 65-92Ruud, P. A. *Classical Econometrics*, Ch 13, pp 245-280Wooldridge, J. *Econometric Analysis*, Ch 12, pp 339-384.Davidson, R. and J. G. MacKinnon, *Estimation and Inference in Econometrics*, 1993, Ch 6, pp 99-138Application: Wooldridge, J. M. "Application of Generalized Method of Moment Estimation," *J. Econ Perspectives* 15(Fall 2001):87-100**III. Estimating Systems of Equations by OLS and GLS: SUR and Panel Data Models**Greene, W.H. *Econometrics Analysis*, Ch 14, pp 339-357, 363-369Wooldridge, J. *Econometrics Analysis*, Ch 7& 10, pp 143-182 & 247-298Greene, W.H. *Econometric Analysis*, Ch 13, pp 283-338Application: Levine, P.B., T.A. Gustafson, and A.D. Velenchik, "More Bad News for Smokers? The Effects of Cigarette Smoking on Wages," *Industrial and Labor Relations Review* 50(1997):493-509.**IV. Stochastic Regressors and Systems of Regression Equations**

A. General Issues and Identification

Greene, W. H. *Econometric Analysis*, Ch 15, pp 378-395Wooldridge, J. *Econometric Analysis*, Ch 9, pp 209-245Fomby, Hill, and Johnson, *Advanced Econometric Methods*, Ch 19-20, pp 439-492Ruud, P.A. *Classical Econometric Theory*, Ch 26, pp 697-717Hausman, J. "Mismeasured Variables in Econometric Analysis: Problems from the Left and Problems from the Right," *J. Econ. Perspectives* 15(Fall 2001):57-67

B. Limited Information Estimation

- Fomby, Hill, and Johnson, *Advanced Econometric Methods*, Ch 21, pp. 472-498
Wooldridge, *J. Econometric Analysis*, Ch 8, pp 183-208
Greene, W. H., *Econometric Analysis*, Ch 15, pp 396-403
Ruud, P. A., *Classical Econometric Theory*, Ch 20 & 26, pp 486-514 & 718-720
Angrist, J. D. and A. B. Krueger, "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments," *J. Econ. Perspectives* 15(Fall 2001):69-86
Bound, J., D. A. Jaeger. and R. M. Baker, "Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak," *J. Amer. Stat. Assoc. (JASSA)* 90 (June 1995):443-450
Staiger, D. and J. H. Stock, "Instrumental Variable Regression with Weak Instruments," *Econometrica* 65(May 1997):557-586
Applications: (i) Angrist, J. D. and W. N. Evans, "Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size," *Amer. Econ. Rev.* 88(1998):450-77
(ii) Becker, G., M. Grossman, and K. Murphy, "An Empirical Analysis of Cigarette Addition," *Amer. Econ. Rev.* 4(June 1994):396-418
(iii) Torok, S. and W. E. Huffman, "U.S.-Mexican Trade in Winter Vegetables and Illegal Immigration," *Amer. J. Agr. Econ.* 68(1986):246-260

C. Full Information Estimation and Testing

- Fomby, Hill, and Johnson, *Advanced Econometric Methods*, Ch 22, pp 499-510
Wooldridge, *J. Econometric Analysis*, Ch 9, pp 209-246
Greene, W. H., *Econometric Analysis*, Ch 15, pp 404-424
Ruud, P. A., *Classical Econometric Theory*, Ch 26, pp 721-729
Application: Tegene, A., W. Huffman, and J. Miranowski, "Dynamic Corn Supply Functions: A Model with Explicit Optimization," *Amer. J. Agr. Econ.* 70(Feb 1988):103-111

V. Time-Series Models

A. Stationary Time-Series Models

- Davidson and MacKinnon, *Econometric Theory and Methods*, 2004, Ch 13, pp 556-604
Enders, W., *Applied Econometric Time-Series*, Ch 1 and 2, pp 1-107.
Greene W. H., *Econometric Analysis*, Ch 12 & 20, pp 250-282 & 608-631
Ruud, P. A., *Classical Econometric Theory*, Ch 25, pp 645-693
Applications: (i) King, R., C. Plosser, J. Stock, and M. Watson, "Stochastic Trends and Economic Fluctuation," *Amer. Econ. Rev.* 81(Sept 1991):819-40
(ii) Baba, Y., D. F. Hendry, R. M. Starr, "The Demand for M1 in the U.S.A., 1960-1988," *Rev. Econ. Studies* 59(Jan 1992):25-61

B. Nonstationary Time-Series Models and Cointegration

- Davidson and MacKinnon, *Econometric Theory and Methods*, 2004, Ch 14, pp 605-649
Enders, W., *Applied Econometric Time Series*, Ch 4, 5, 6, pp. 156-386
Greene, W. H., *Econometric Analysis*, Ch 20, pp 631-662
Applications: (i) Nelson, C. and C. Plosser, "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications," *J. Monetary Economics* 10(1982):130-162
(ii) Enders, W. "ARIMA and Cointegration Tests of Purchasing Power Parity," *Rev. Econ. & Statistics* 70(Aug 1988):504-08

C. Forecasting

- Fomby, Hill, and Johnson, *Advanced Econometric Methods*, Ch 23, pp 512-526
Enders, W., *Applied Econometric Time Series*, Ch 5, pp 269-343