1. GENERAL DESCRIPTION

This course presumes that students have completed ECN 525 and ECN 526 or equivalent. The goal of this course is to acquaint students with techniques they may wish to apply in thesis research.

2. TEXTBOOKS

1) Required

Baltagi, ECONOMETRIC ANALYSIS OF PANEL DATA (Wiley)
Hamilton, TIME SERIES ANALYSIS (Princeton)

2) Optional

Greene, ECONOMETRIC ANALYSIS, 3rd ed (Prentice)
Banerjee, Dolado, Galbraith and Hendry, COINTEGRATION, ERROR CORRECTION AND ECONOMETRIC ANALYSIS OF NONSTATIONARY DATA (Oxford)
Maddala, LIMITED DEPENDENT AND QUALITATIVE VARIABLES IN ECONOMETRICS (cambridge)

3. COURSE OUTLINE

The schedule listed below is just an estimate. Adjustments, if necessary, may happen during the term.

(1) Review of MLE

1. Review of MLE
2. Testing hypothesis
(2) Limited Dependent Variables Models

1. Binary choice models (Review)
2. Ordered probit model
3. Unordered choice models
4. Bivariate probit models
5. Double selection models
6. Switching models

(3) Generalized Method of Moments (GMM) Estimation

1. The principle of GMM
2. Properties of GMM estimators
3. Three ways to obtain optimal GMM
4. Estimation of covariance matrices of moment functions
5. Testing hypothesis
6. Specification tests
7. Application to simultaneous equation models
8. Problems in GMM applications
9. Bootstrapping

(4) Panel Data

1. Introduction to panel data models
2. Fixed effects vs. random effects
3. Heteroskedasticity and autocorrelation
4. Instrumental-variables and GMM estimators
5. Probit/logit models
6. Dynamic Panel Data Models
7. Rational Expectations Models
8. Intertemporal Substitution Models

(5) Univariate Time Series Analysis

1. Stationarity
2. AR and MA
3. MLE
4. Spectral analysis

(6) Vector Autoregression (VAR)

1. Estimation and testing hypothesis
2. Impulse-response function
3. Structural VAR
(7) Autoregressive Conditional Heteroskedasticity (ARCH) in Time Series Models

1. Basic model
2. ARCH
3. GARCH
4. ARCH-M
5. EGARCH
6. TGARCH
7. Multivariate GARCH
8. Quasi-MLE

(8) Nonstationary Time Series Data

1. Trend stationary and unit root
2. Testing unit root

(9) Cointegration

1. Definitions
2. Testing cointegration
3. Estimation in cointegration systems

(10) Panel Data with Large T

1. Testing unit root
2. Properties of panel data estimators

4. REFERENCES

(1) Review of MLE

Greene, Ch. 3 - 5.
Amemiya, Ch. 3.

(2) Limited Dependent Variables Models

1. Greene, Ch. 19.1 - 19.5.
Maddala, Ch. 2.
Amemiya, Ch. 9.6.
Judge, G., at el (1985), The Theory and Practice of Econometrics, John Wiley & Son Inc.,
Ch. 18.2.

2. Greene, Ch. 19.8.

3. Greene, Ch. 19.7.
Maddala, Ch. 2.12, 3.1 - 3.3.

4. Greene, Ch. 19.6.
Maddala, Ch. 11.6.

5. Maddala, Ch. 1, 6.
Greene, Ch. 20.1 - 20.3.
Amemiya, Ch. 4, 9, 10.
Maddala, appendix.


(2) Generalized Method of Moments (GMM) Estimation

Basic references:
  Greene, Ch. 11.5.
  Hamilton, Ch. 10, 14.


**Econometrica**, 50, 483-499.


(3) Panel Data

1. Baltagi, Ch. 1.

2. Baltagi, Ch. 2 - 4.
Greene, Ch. 14.


3. Baltagi, Ch. 5.

4. Baltagi, Ch. 7.
   Econometrica, 1377-1399.
   Error-components Model,” Econometrica, 869-880.
   Econometrica, 695-701.
   Empirical Comparison of Instrumental Variables Estimators,” Journal of Applied
   Econometrics, 5, 401-406.
   Comparison of Instrumental Variables Estimators,” Journal of Applied
   Econometrics, 3, 149-155.
   Chapter 8 in Generalised Method of Moments Estimation (1999), edited by Laszlo
   Matyas: Forthcoming.
   Data Models with Strictly Exogenous Explanatory Variables,” Journal of
   Econometrics, 93, 177-201.
   of Panel Data Models with Strictly Exogenous Instrumental Variables,” in
   Analysis of Panels and Limited Dependent Variables: A Volume in Honour of G
   S Maddala, edited by Cheng Hsiao, Kajal Lahiri, Lung-fei Lee and M. Hashem

5. Baltagi, Ch. 10.4 - 10.5.
   Greene, Ch. 19.5.
   Maddala, Ch. 2.17.
   Economic Studies, 225-238.
   Honore, B. (1993), “Orthogonality Conditions for Tobit Models with Fixed Effects and
   International Economic Reviews, 33, 681-703.
   Econometrics, 59, 5-33.

6. Baltagi, Ch. 8.

7. Baltagi, Ch. 8.5.


(5) Univariate Time Series Analysis

Hamilton, Ch. 1 - 6.

(6) Vector Autoregression (VAR)

Hamilton, Ch. 10 - 11.

(7) Autoregressive Conditional Heteroskedasticity (ARCH) in Time Series Models

Basic references:
Greene, Ch. 18.5.
Hamilton, Ch. 21.

Lumsdaine, R., 1996, Consistency and asymptotic normality of the quasi-maximum likelihood estimator in IGARCH(1,1) and covariance stationary GARCH(1,1) Models, Econometrica, 64, 575-596.

(8) Nonstationary Time Series Data

Hamilton, Ch. 15 - 18.
Banerjee, et al, Ch. 3 - 4.
Schwert, G.W., Effects of model specification on tests for unit roots in macroeconomic data, Journal of Monetary Economics, 20, 73-103.
Kwiatkowski, D., P. Phillips, P. Schmidt and Y. Shin, 1992, Testing the null hypothesis of stationarity against the alternative of a unite root: How sure are we that economic time series have a unit root?” Journal of Econometrics, 54, 159-78.

(9) Cointegration

Hamilton, Ch. 19 - 20.
Banerjee, et al, Ch. 5 - 8.
Engle, R.F. and C.W. Granger, 1987, Co-integration and error correction:
   Representation, estimation, and testing, Econometrica, 55, 251-276.

(10) Panel Data with Large T

1. Levin, A. and C-F Lin, 1992, Unit root tests in panel data: Asymptotic and finite-sample properties, mimeo, University of California at San Diego.
Levin, A. and C-F Lin, 1993, Unit root tests in panel data: New results, mimeo, University of California at San Diego.

Choi, I., 1999, Asymptotic analysis of a nonstationary error component model, mimeo, Kookmin University, South Korea

4. GRADE

(1) Four Assignments:
These assignments count 40% of your final grade. The assignments will require knowledge of computer software. A maximum grade of “C” will be awarded to those who choose NOT to complete homework assignments.

(2) Proposal for the Term Paper:
You should write a proposal for your independent research, and it is due no later than Monday, April 17. Your proposal counts 10% of your final grade. Your proposal should indicate the importance of your independent study and a brief discussion of methodology you will use. The proposal should not be more than 5 pages. Before you
decide on a topic, contact Dr. Ahn.

(2) A Term Paper:

You should write a paper, which counts 50% of final grade. The font sizes are limited to minimum 12 pt. Margins must be all 1 inches for top, bottom, left and right. The paper **should not be more than 25 pages** (including tables and bibliographical lists.) Note that the number of pages is not necessarily correlated with grade. Concise and compact papers are strongly encouraged. A final draft of the paper is due no later than Monday, May 8, 12:00 pm.

You may choose one of following categories:

1. **Empirical Paper:** You have to collect your own data set and apply advanced econometric techniques. The paper should describe (i) motivation; (ii) relevance of econometric techniques applied; (iii) and correct interpretation of empirical results.

2. **Survey Paper:** You can survey the literature regarding an econometric topic. The paper should refer to as many references as possible, and summarizes the references in an unique way. It is also important to point out the limitations of the studies in the literature, and introduce some constructive suggestion on future studies.

3. **Theory Paper:** You can prove some econometric theorems which are not proven in the literature, or provide alternative proofs for existing econometric theorems.