Econ 9473 Econometric Methods II Fall 2009 Shawn Ni

Class: MW 3:30-4:45, STANLEY HALL 226.

Office Hours: W 10:00-11:30 or by appointment.

Office: 329 Professional Building.

Phone and Email: 882-6878, NiX@missouri.edu

Textbook: *Econometrics* by Fumio Hayashi, Princeton University Press 2000.

The website of the book is http://pup.princeton.edu/titles/6946.html.

Answers to selected review questions and analytical questions in the book can be found at http://fhayashi.fc2web.com/rqans.htm, and http://fhayashi.fc2web.com/analqs.htm

Data sets used by the articles cited in the book are available at http://fhayashi.fc2web.com/datasets.htm

Course Content: The materials covered in the course will mostly come from Chapters 1 to 8 of the Hayashi book. The main subjects are: OLS, large sample theory, GMM, panel data, and MLE. The book covers a wide range of techniques with GMM as the organizing principle. The course will discuss conditions under which the techniques listed above are applicable and how to apply them.

Teaching Style: I will rely heavily on numerical examples and Monte Carlo simulations for illustrations of econometric theories. For most lectures, there will be a handout containing the summary of the main topic for the lecture, key technical details, and suggested questions.

Course Requirement: There will be 6 homework assignments, an empirical project, a midterm, and a final exam. The topic of the empirical project will be chosen by the student. A reasonable project is a replication and modification of a published paper using one of the techniques covered in the class. The grade is determined by the formula 25%× homework + 10%× project + 25%× midterm + 40%× final exam.

You must know basic calculus and matrix algebra, and have taken Econometrics I (Econ 8472) before enrolling in the course. You will also need to write computer programs for homework and the empirical project. There is no restriction on the programming langauge but note that it is efficient to use one language through out the semester. Commonly used programming languages include GAUSS (www.aptech.com), RATS (www.estima.com), SAS

(www.sas.com), Stata (www.stata.com), R (free online, or S-Plus), MATLAB (available at the Middlebush Computer Lab), and Fortran (which I use for numerical simulations for the class).

Course Outline

(The coverage of the topics are subject to change depending on the progress of the semester.)

1. Finite-Sample Properties of OLS

- The Classical Linear Regression Model
- Finite-Sample Properties of OLS
- Hypothesis Testing under Normality
- Relation to Maximum Likelihood
- Generalized Least Squares (GLS)

Homework 1

2 Large-Sample Theory

- Limit Theorems for Sequences of Random Variables
- Fundamental Concepts in Time-Series Analysis
- Large-Sample Distribution of the OLS Estimator
- Hypothesis Testing
- Testing for Serial Correlation

Homework 2

3 Single-Equation GMM

- Endogeneity Bias
- Generalized Method of Moments
- Large-Sample Properties of GMM
- Testing Overidentifying Restrictions

4 Multiple-Equation GMM

- The Multiple-Equation Model
- Single-Equation versus Multiple-Equation GMM Estimation

Homework 3

Midterm

5 Panel Data

- The Error-Components Model
- The Fixed-Effects Estimator

Homework 4

6 Serial Correlation

- Modeling Serial Correlation: Linear Processes
- ARMA Processes
- Vector Processes
- Estimating Autoregressions
- Asymptotics for Sample Means of Serially Correlated Processes
- Incorporating Serial Correlation in GMM

Homework 5

7 Extremum Estimators

- Consistency and Asymptotic Normality of Extremum Estimators
- Hypothesis Testing
- Numerical Optimization

8 Examples of Maximum Likelihood

- Qualitative Response (QR) Models
- Truncated and Censored Regression Models
- Multivariate Regressions
- FIML
- LIML
- Serially Correlated Observations

Homework 6

Final Exam