ECON 818, Fall 2024
Advanced Econometrics II

Instructor Contact Information

Instructor Name and Preferred Title: Zongwu Cai, Professor
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Office Hours: MW 10:30 am – 12:00 pm, or by appointment

Class Time and Location

Class Time: MW 12:30 pm – 13:45 pm
Class Location: Snow 454
Semester: Fall 2024

Course Hours and Instructional Methods:

This is an in-person course that fulfills 3 credit hours. Consistent with KU policy and the federal definition of a credit hour, this means you should expect to spend at least 9 hours a week on this course over the 15-week semester. Most weeks 2.5 hours will be instructional time in the classroom (i.e., class meetings) and the remaining time will involve out-or-class work. The instructional mode will be lecture only, but often conducted as a seminar with in-class discussion and possible collaboration on research.

Course Description

This is one of the core courses required for the Ph.D. program in economics and it is about the study of estimation and hypothesis testing within the context of the stochastic simultaneous equation models, such as, for linear and nonlinear parametric regression models, which can be applied in microeconomics and macroeconomics research. It emphasizes on theory and methodologies as well as applications. Inference with those models will be by nonlinear parametric, semi-parametric, and nonparametric methods. Prerequisite: ECON817.

Learning Outcomes

After successful completion of this course, you will be able to:

1. Conduct state of the art publishable research on advanced econometrics.
2. Participate actively in international conferences using microeconomic theory and macroeconomic theory empirically.
3. Be identified internationally as an authority on advanced econometrics.
4. Contribute to governmental research and policy using advanced econometrics.
5. Carry on your own research in a manner identifying you within the profession as affiliated with others having expertise in your research.
6. More importantly, learn R or Python (coding techniques) for doing real data analysis and conducting Monte Carlo simulation studies. Here, I encourage you to learn the software R first, which is close to C++ language.

Course Materials

The textbook for this course is *"Econometric Theory and Methods"* by Russel Davidson and James MacKinnon (2004) [Oxford University Press, New York, ISBN 978-0-19-512372-2]. The topics include Chapters 9 – 11, and some additional materials such as my own lecture notes on *"Nonparametric Econometrics"*, which can be downloaded from the course website. If needed, some materials will be sent via e-mail.

Course Assignments and Requirements

Reading assignments for each class will depend upon the speed with which the class progresses through the relevant material as well as the research interests of the class. Problems for Homework will be assigned at class meetings. No late homework will be accepted. Missed homework will receive a grade of zero. The homework will be collected at the end of each chapter (the due date will be announced later) and graded. You are allowed to work with other students on the computer coding for some homework problems, however, verbatim copying of homework is absolutely forbidden. Therefore, each of you must ultimately produce your own homework to be handed in and graded. Homework assignments are long and painful and require a lot of effort on your part, but you will not be able to do well on exams without doing homework assignments.

When you submit your HW, please use your name as the file name, for example, Cai_HW#1.pdf, in the PDF format. Please send it to me and my GRA, Miss Jingyan Li (jeannie_0314@ku.edu) via e-mail. If your HW is based on your handwriting, please scan it to be PDF format. For some excises for real data analysis, I only need your results and interpretations. Please do not include the computer codes.

Exams

There is only one exam which will be on October 16 (Wednesday, after the fall break). The exam is closed book. However, you may choose to prepare a formula sheet for reference for the exam. No missed exam can be made up for any reason.

Term Paper

In this class, each student is required to write a short paper involving econometric analysis using nonparametric tools. For detailed guideline for the term, please the requirements at the end of this file (page 6).

General Assignment Information

- Unsolved problems in the relevant literature will be emphasized in class along with the kinds of expertise needed to solve the problems.
- Students interested in contributing to this literature by solving those unsolved problems will be encouraged to do so.
- Students wishing to apply but not extend the methodology covered in the course will be encouraged to do so, if focused on a new application not previously published.
- A term paper by using nonparametric techniques learned from this course to analyze real data (applied problems) or reading papers from original publishable research is required. You need to a presentation for this at the end of the semester (see the schedule later).

Evaluation Criteria and Grading Scale

Student Survey of Teaching

You will have multiple opportunities to provide feedback on your experience in this course. Suggestions and constructive criticism are encouraged throughout the course and may be particularly valuable early in the semester. You will also be asked to complete an end-of-semester, online Student Survey of Teaching, which could inform modifications to this course (and other courses that I teach) in the future.

Grading

Students taking the course for a grade are required to complete all the homework assignments, the exam, and the term paper with its class presentation (possibly on December 9 and 11), which will include some applications of the methods that you have learned in the course. **Exam makes up 1/3, homework counts 1/3, and the term and presentation count 1/3 of the course grade**.

Grading Scale

89.5% - 100% = A
84.5% - 89.4% = B+
79.5% - 84.4% = B
74.5% - 79.4% = C+
0.00% - 74.4% = C

Incomplete Grades

You may be assigned an 'I' (Incomplete) grade if you are unable to complete some portion of the assigned course work because of an unanticipated illness, accident, work-related responsibility,

family hardship, or verified learning disability. An Incomplete grade is not intended to give you additional time to complete course assignments or extra credit unless there is indication that the specified circumstances prevented you from completing course assignments on time.

Attendance Policy

The attendance policy is consistent with the University Excused Absences policy (USRR 2.2.1).

Academic Success

In addition to any polices and resources noted above, the KU Academic Success Student Resources website provides links to KU Policies and Resources pertaining to academic misconduct, grading polices, harassment and discrimination, diversity and inclusion, mandatory reporting, equal opportunity and affirmative action, and student rights and responsibilities. Please visit the site to familiarize yourself with these policies and resources. If you have questions or concerns about any of these policies, statements, or resources, please let me know, or contact Student Affairs directly.

Diversify and Inclusion Policy

Here is the diversity and inclusion policy at KU. As a premier international research university, KU is committed to an open, diverse and inclusive learning and working environment that nurtures the growth and development of all. KU holds steadfast in the belief that an array of values, interests, experiences, and intellectual and cultural viewpoints enrich learning and our workplace. The promotion of and support for a diverse and inclusive community of mutual respect require the engagement of the entire university.

Course Schedule

Week	Date	Topic	Assignment	Due Today
1	August 26, 28	Chapter 9: GMM	Read Chapter 9 of Textbook	
2	Sept 4	Chapter 9: GMM Labor Day—No class on Monday	Chapter 9 of Textbook	Labor Day on Sept 2
3	Sept 9, 11	Wednesday: Some Nonparametric GMM Methods	Lebwel (2007, EL) and Read Cai and Li (2008, ET)	
4	Sept 16, 18	Chapter 10: MLE	Read Chapter 10 of Textbook	Due day for HW#1 from Chapter 9

Week	Date	Topic	Assignment	Due Today
5	Sept 23, 25	Chapter 10: MLE	Read Chapter 10 of Textbook	
6	Sept 30, Oct 2	Chapter 11: Discrete and Limited Dependent Variable	Read Chapter 11 of Textbook	Due day for HW#2 from Chapter 10
7	Oct 7, 9	Chapter 11: Discrete and Limited Dependent Variable	Read Chapter 11 and Handouts	
8	Oct 16	The first EXAM is on Oct 16		Fall break is on Oct 14
9	Oct 21, 23	Chapter 1 of Lecture Notes: Density, Distribution & Quantile Estimations	Read Chapter 1 of Lecture Notes	Due day for HW#3 from Chapter 11
10	Oct 28, 30	Chapter 1 of Lecture Notes: Density, Distribution & Quantile Estimations	Read Chapter 1 of Lecture Notes	
11	Nov 4, 6	Chapter 1 of Lecture Notes: Density, Distribution & Quantile Estimations	Read Chapter 1 of Lecture Notes	
12	Nov 11, 13	Chapter 2 of Lecture Notes: Nonparametric Regression Models	Read Chapter 2 of Lecture Notes	Due day for HW#4 for Chapter 1 of Lecture Notes
13	Nov 18, 20	Chapter 2 of Lecture Notes: Nonparametric Regression Models	Read Chapter 2 of Lecture Notes	
14	Nov 25	Thanksgiving—No class on Wednesday Monday: Chapter 2 of Lecture Notes: Nonparametric Regression Models	Read Chapter 2 of Lecture Notes	Start to read papers and prepare your presentation
15	Dec 2, 4	Chapter 3 of Lecture Notes: Nonparametric Quantile Models	Read Chapter 3 of Lecture Notes	
16	Dec 9, 11	Last Week of Classes	Presentations	Due day for HW#5 for Chapters 2 and 3 of Lecture Notes
17	Dec 16-20	Finals Week		The final PPT for presentation is due December 16

Term Paper Guidelines

The term paper provides an opportunity to apply the advanced econometric tools learned in class to a real-world issue chosen by the student. You need to choose your own topic and gather or find or download your own data. This approach requires a bit more time but also requires you to propose your own model within the confines of the data provided. I recommend that you choose a topic in which you are interested but also one with a narrow focus. A narrow focus increases the probability that the project will both be completed by the semester's end and be of sufficient quality.

I recommend you begin thinking about this project as soon as possible and to avoid putting off writing the paper until the last few days of class. A good strategy is to talk to me about your project early in the semester, to keep in contact with me concerning your data and estimations as well as testing procedures before the final draft is submitted.

The final version of the term paper is due at the end of the semester and the due date will be announced later.

There are a few guidelines that you must follow:

1. The term paper should be **about 10 double-spaced and single-sided pages**.
2. Papers should be generally structured in the following manner:
   - Introduction of the economic/econometric problem - what are you doing and why do we care?
   - Brief review of previous literature dealing with your problem (include standard academic references)
   - Introduction of your econometric model and data, including specific data source(s)
   - Review and interpretation of your estimation results
   - Concluding remarks
   - Reference list
   - Econometric results in tabular form
   - Figures if any
3. You must provide an electronic form of your data, programs, program output and paper. If I do not receive all required files, you will receive a zero score on the term paper.
4. You will be asked to do a presentation for your term paper. You will have about 15 minutes for your presentation and about 5 minutes for questions. The date for your presentation will be decided later (possibly at the end of the semester, say, December 9 and 11).