

**Econ 609**  
**Econometric Methods**  
SPRING 2022

**Instructor:** Hyungsik Roger Moon, KAP 310B, 213-740-2109, email: moonr@usc.edu

**Time:** Mon, Wed 4:00PM - 5:50PM in PST.

**Classroom Location:** KAP 159.

**Zoom Information:** Use the zoom ID in Blackboard (for the first week and some other classes).

**Office Hours:** By email and appointment.

**Prerequisites:** Econ 611 and its equivalences.

**TA:** Zhan Gao.

**Main Reference:**

The following are useful references for the course. We will follow mostly the lecture notes (available from Blackboard) and some chapters of Hansen (2021). Most of the problem set questions will be from the Hansen book.

- Bruce Hansen, *Econometrics*, 2021.

This is a manuscript by Bruce Hansen which is available from Bruce Hansen's web page, <https://www.ssc.wisc.edu/~bhansen/>. A pdf file of the book is also available from Blackboard. I strongly recommend to follow the book. This book is the best book for the first year Ph.D. econometrics.

- William Greene, *Econometric Analysis*, 7th ed. Prentice Hall

**Other References:**

- Jeffrey Wooldridge, *Econometric Analysis of Cross Section and Panel Data*, MIT Press
- Russell Davidson and James MacKinnon, *Estimation and Inference in Econometrics*, Oxford University Press
- Fumio Hayashi, *Econometrics*, Princeton University Press
- A.W. Van der Vaart, *Asymptotic Statistics*, Cambridge University Press
- *Handbook of Econometrics Vol 4*, Chapter by McFadden and Newey
- Bruce Hansen, *Statistics and Probability*, 2019, Manuscript, available from <https://www.ssc.wisc.edu/~bhansen/>.

**Grading:** There will be assignments, a midterm exam and a final. They will count toward the grade as follows.

Assignments	10%
Midterm	30%
Final	60%.

**Exams:** The midterm exam date will be announced later. The final exam is on May 4 (Wednesday) from 4:30PM to 6:30PM in PST.

“Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to me as early in the semester as possible. DSP is open Monday – Friday, 8:30 – 5:00. The office is in Student Union 301 and their phone number is (213) 740-0776.”

## Description of the Course

This course is a second semester econometrics course mainly for the first year economics Ph.D. program students. The main objective of the course is to introduce basic econometrics theories in regression analysis and some of widely used econometrics models in empirical applications. The main emphasis of the lectures will be on theoretical issues. Empirical exercises will be assigned through homework assignments.

### Topics

- Classical linear regression model (Lecture Notes, Chapters 3,4 of Hansen)
- Asymptotics – various convergence concepts, central limit theorems (Lecture Notes, Chapters 5,6 of Hansen)
- General inference methods – maximum likelihood method and generalized method of moments method (Lecture Notes, Chapters 7,9,13,14 of Hansen)
- Testing – Wald test, Lagrangian multiplier (LM) test (or score test), likelihood ratio (LR) test, J-test for overidentification (Lecture Notes, Chapters 8,13)
- Introduction of Nonparametrics and Resampling methods (Lecture Notes, Chapters 10,11,12 of Hansen)
- Introduction to Statistical Learning (Lecture Notes)
- Applications
  - Classical linear regression model
  - Heteroskedasticity
  - Instrumental variables
  - Limited dependent variable models
  - Simple time series regression models and tests for serial correlations (if time permits)
  - Seemingly unrelated regressions (if time permits)
  - Simultaneous equation models (if time permits)
  - Linear panel data models (if time permits)