Econ 180.633 – Econometrics

Spring 2021

Instructor: Yingyao Hu

Course webpage:
https://blackboard.jhu.edu/
It is your responsibility to check the webpage for announcements and other updates.

Course Description: This course gives a rigorous introduction in econometrics. It mainly covers the linear regression model. Knowledge of statistics at the level of 180.636 is assumed as well as knowledge of calculus at the level of the Appendix in Greene's textbook below. Students who do not have at least this level of mathematics preparation should not take this course.

Prerequisites: Statistics Inference (AS.180.636), Microeconomic Theory (AS.180.601), Mathematical Methods in Economics I (AS.180.615) (or Mathematical Economics (AS.180.614))

Meeting Time: Wednesday 10:00-12:00 on Zoom

Grading Policy: The course work will consist of two exams plus some assigned problem sets. The components of the final grade are:

final exam,	50%	TBA (set by the department),
midterm exam,	40%	March 10, 2021
homework,	10%	

Textbook:
Bruce Hansen, *Econometrics*, free online lecture notes,
(http://www.ssc.wisc.edu/~bhansen/econometrics/)
William Greene, *Econometric Analysis*, Prentice-Hall Inc. (expensive)
Jeffery Wooldridge, *Introductory Econometrics: A Modern Approach.* (undergraduate level)
A. Pagan and A. Ullah, *Nonparametric Econometrics*, Cambridge University Press: Cambridge, UK.

Office Hours: Tuesday 3-4pm or by appointment. The best way to reach me is through email (yhu@jhu.edu).

TA: Tong Zhou (tzhou11@jhu.edu)
        Office hours: TBA

If the office hours are not convenient then please arrange to meet TA or me at some other time (email is a convenient way to set up appointments). TA will be available to consult regarding homework or anything related to the course material. TA will do all the grading including homework. So you should consult TA first regarding homework issues.

Course Outline
(Some topics will be covered only if time permits)

1 A very short math&stat review (Hansen's appendices)
2. Least squares regression:
       Probabilistic foundation (Hansen's ch2)
       Algebra (Hansen's ch3)
       Finite sample properties (Hansen's ch4)
       Asymptotics (Hansen's ch6&7)
       Restrictions on parameters (Hansen's ch8)
       Hypothesis testing (Hansen's ch9, Greene's ch5-6)

3 Further topics on linear regression
       Endogeniety—IV (Hansen's ch12, Greene's ch8)
       Heteroscedasticity—GLS (Hansen's ch4, Greene's ch9, *see below)
       Serial correlation (Hansen's ch14-15, Greene's ch20)
       Panel data models (Hansen's ch17, Greene's ch11)
       Seemingly unrelated regressions (Hansen's ch11, Greene's ch10)
       Simultaneous equations models (Greene's ch11)
       Quantile regression (Hansen's ch22, Pagan Ullah page 239)
4 Nonlinear models
       Generalized method of moments (Hansen's ch13, Greene's ch13)
       Nonlinear regressions (Hansen's ch22, Greene's chapter 7)
       Limited dependent variables (Hansen's ch22, Greene's ch17-19, **see blow)
       Maximum likelihood estimation (Hansen's ch5, Greene's chapter 14)
5 Nonparametrics & other topics
       Nonparametric regression: kernel & series (Hansen's ch19&20)
       Nonparametric density estimation (Pagan Ullah's ch1)
       Bootstrap (Hansen's ch10)
       Empirical likelihood

Note:
*GLS:
Heteroscedasticity (ARCH),
autocorrelation,
Seemingly unrelated regressions
Linear panel data model: random vs fixed effects

**Nonlinear models:
Probit, logit
Tobit
Sample selection (Wooldridge 17.4)
Duration model