Economics 7828   Spring 2019

Prof. Xiaodong Liu

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Course Description:

This is the second course of the first year econometrics sequence. Built on the fundamental concepts in probability and statistics covered in ECON 7818, this course introduces linear and nonlinear regression models, and methods for estimation and inference.

Prerequisite: ECON 7818 (or equivalent).

Text:

Davidson, R. and J. G. Mackinnon, 2004, *Econometric Theory and Methods*, Oxford University Press.

Other Reference Books:

1. Davidson, J., 2000, *Econometric Theory*, Blackwell Publishing.

2. Cameron, A. C. and P. K. Trivedi, 2005, *Microeconometrics*, Cambridge University Press.

Assessment:

There will be a midterm exam, a final exam, and periodic problem sets.

1. Homework assignments (20%)

2. Midterm examination (40%)

3. Final Examination (40%)

Tentative Course Outline:

1. Linear Regression Models

    a. Specification of regression models
    b. Method of moments estimation
    c. Geometry of vector spaces and OLS
    d. The Frisch-Waugh-Lovell Theorem
    e. Influential observations

2. Statistical Properties of Ordinary Least Squares

    a. Unbiasedness
    b. Consistency, asymptotic normality and efficiency
    c. Residuals and error terms
    d. Misspecification
    e. Goodness of fit

3. Hypothesis Testing and Confidence Intervals

    a. Exact tests in the classical linear model
    b. Large sample tests
    c. Exact and asymptotic confidence intervals and confidence regions
    d. Heteroskedasticity-consistent covariance matrices
    e. The delta method

4. Nonlinear Regression

    a. Method of moments estimators for nonlinear models
    b. Nonlinear least squares
    c. The Gauss-Newton Regression
    d. One-Step Estimation
    e. Hypothesis testing

5. Generalized Least Squares

    a. GLS and feasible GLS estimators
    b. Heteroskedasticity
    c. Autoregressive and moving-average processes
    d. Testing for serial correlation
    e. Panel data models

6. Instrumental Variables Estimation

    a. Instrumental variables
    b. Statistical properties of IV estimators
    c. Hypothesis testing
    d. Testing overidentifying restrictions
    e. DWH tests
    f. IV estimation of nonlinear models

University Policies

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see Temporary Medical Conditions under the Students tab on the Disability Services website.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (including sexual assault, exploitation, harassment, dating or domestic violence, and stalking), discrimination, and harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website. Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See the campus policy regarding religious observances for full details.