

Course Structure: Econometrics I (ECO 5401)

Instructor: Kanika Mahajan
Office: 814 (New Academic Block 04)
Office Hours: Yet to be decided
Email: kanika.mahajan@ashoka.edu.in

Course Objective and Outline:

In today's world analyzing any problem at hand using data is an important skill. This course is designed to equip students to learn the statistical tools for analyzing real life data, related to economics in particular and social sciences in general. This course will focus on both theoretical knowledge as well as implementation of theory through software applications like STATA and real datasets. The main thrust of the course will be data analysis using multivariate regression technique, followed by specific econometric tools for cross-sectional and program evaluation. An important objective of this course is to acquaint students with the language of advanced econometrics so that they can later pick-up higher order courses in this area.

Prerequisites

Statistics

Textbooks and Articles

Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 4th or 5th edition (JMW)

Wooldridge, J. *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., MIT Press, 2010. (CSPD)

Cameron, A.C. and Trivedi, P.K. *Microeconometrics using Stata*, 2nd ed., Stata Press, 2010

Angrist, J.D and Pischke, J.-S. *Mostly Harmless Econometrics*, Princeton University Press, 2008. (MHE)

Mathematical Statistics with Applications, John E. Freund, Irwin Miller and Marylees Miller, 8th editions (Freund)

Greene, W.H., *Econometric Analysis*, (7th edition), Pearson, 2012 (Optional)

Evaluation

Homeworks: 35%

Mid-term: 25%

Final: 40%

Homework problems will generally be based on data. Homework assessments will be submitted individually. Group discussions are allowed but plagiarism will be dealt with a fail grade on the assessment and on the course for repeated violation. STATA based assessments should be accompanied with proper outputs and explanations. Assignments must be submitted in time on google classroom. Late submission will not be graded. Cheating during exams will be dealt with by a fail grade on the course.

Course Structure: Below is a broad course outline. These will be accompanied with papers.

1. Review of statistics and matrix algebra
 - a. Joint distribution and conditional expectation
 - b. Hypothesis Testing
 - c. Matrix Algebra

JMW: Appendices (B, C (exclude C.4), Freund Ch 13) and Class Notes
2. Multivariate Regression Analysis with cross-section data:
 - a. Matrix Formulation, Partialling out interpretation, Goodness of Fit, OLS as Best Linear Unbiased Estimator (BLUE);

JMW: Appendices (D), Ch 3; CSPD: Ch 4

- b. Hypothesis testing: Linear combination of parameters, Multiple Linear restrictions
CSPD: Ch 4, JMW: Ch 4
 - c. Asymptotic properties of the OLS estimator
CSPD: Ch 4(Excluding Asymptotic Efficiency)
 - d. Specification issues: Omitted Variable Bias, Non spherical disturbance: Generalized Least Squares, Measurement Error
CSPD: Ch 4; JMW: Ch 8, 9.3, Ch 12 (Exclude Durbin-Watson Test, GARCH and correcting for AR(2))
 - e. Dummy variables: Intercept and slope effects; Interaction; Testing linear restrictions using F-Tests;
CSPD: Ch 6; JMW: Ch 7
- 3. Multivariate Regression Analysis with Panel data
JMW: Ch 13, 14; CSPD: Ch 10
- 4. Causal methods:
 - a. Program Evaluation
 - b. Instrumental Variables
 - c. Difference-in-Difference IntroductionJMW: Ch 13(Exclude Chow Test, 13.3, 13.4). MHE: Ch 5
- 5. STATA Instruction: Using Wooldridge datasets and unit level National Sample Survey data