Advanced Econometrics (1): M.A Program
Course Syllabus
Department of Economics
Faculty of Social Sciences and Economics
Fall 2024
Class: Sun 9:30-11am at Room 301 & Mon: 9:30-11am at Room 104.
Course website: http://staff.alzahra.ac.ir/safarzadeh

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Course Description

Econometrics introduces you the regression methods for analyzing data in economics. This course emphasizes both the theoretical and the practical aspects of statistical analysis, focusing on techniques for estimating econometric models of various kinds and for conducting tests of hypotheses of interest to economists. The goal is to help you develop a solid theoretical background in introductory level econometrics, the ability to implement the techniques and to critique empirical studies in economics.

Prerequisite

This is the first Econometrics course for MA students in Economics. The prerequisite courses include Introduction to Statistical Methods in Economics or equivalent and elementary econometrics. Students should be familiar with basic concepts in probability theory and statistical inference and topics at elementary level, such as Gujarati's Basic Econometrics. The course includes a brief review on these topics.

Textbook

Required Textbooks:

- Jeffrey M. Wooldridge (2016), "Introductory Econometrics: A Modern Approach", 6th edition, South-Western College Pub.
- Jack Johnston and John Dinardo, (1997), "Econometric Methods", Fourth Edition, McGraw-Hill.

Evaluation

Grades for the course will be based on:
• Homework (8 Assignment sets): 20%
• Midterm: 20%
• Final: 60%
• Class participation/quizzes: 10% (bonus)

Exams

There will be one midterm exam and one cumulative final exam. All exams are closed-book, closed-notes. You are allowed to bring in a simple/scientific calculator.
The final exam will take place on Sat, Jan 25, 2025 (BH 06, 1403) at 08 - 10 am. The midterm will be in class on Sun, NOV 17, 2024(ABN 27, 1403).

Software

This course will use EViews as our main statistical software. The latest version is EViews 13, but any version later than EViews 8 suffices for the purpose of this course.

Tentative Course Outline

Note the following course outline is tentative and therefore subject to change during the process.

1. Introduction ([W] Ch. 1, [W] Append B&C. [J.D] Append A & B)
- Course outline and logistics
- Review of Probability and Statistics
- Review of Matrix Algebra
- The Econometric Approach
- Models, Economic Models, Econometric Models
- Data and Refined Data

2. Multiple Regression Analysis: Estimation ([W] Ch. 3, [J.D] Ch.3)
- Specification and Estimation
- Interpretations of OLS estimates
- Geometric Interpretation of Least Squares Problem
- Gauss-Markov Theorem
- Specification issues
- Maximum Likelihood Estimation (MLE)

3. Multiple Regression Analysis: Inference ([W] Ch. 4, 6 &7, [J.D] Ch.3 &4)
- Testing some single population parameters
- Testing multiple linear restrictions
- Specification Error
- Model Evaluation and Diagnostic Tests
- Test of Parameter Constancy
- Test of Structural Change
- Dummy Variables

4. MLE, GLS & IV Estimators ([J.D] Ch.5]
- Maximum Likelihood Estimators
- Likelihood Ratio, Wald and Lagrange Multiplier Tests
- Linear Models Whit Nonspherical Disturbances (GLS Estimator)
- Instrumental Variable (IV) Estimators

5. Heteroscedasticity and Autocorrelation ([J.D] Ch.6, ([W] Ch. 8)
- Tests of Heteroscedasticity
- Estimation Under Heteroscedasticity
- Autocorrelated Disturbances
- Tasting for Autocorrelated Disturbances
- Estimation Under Autocorrelated Disturbances

6. Simultaneous Equations Models ([J.D] Ch.9, ([W] Ch. 16]
- The use of structural models
- Simultaneous equations bias
- The identification problem
- The structure and the reduced form
- Estimation of Simultaneous Equations Systems
  - Indirect Least Squares
  - Two-Stage Least Squares
  - Instrumental Variables
  - Three-Stage Least Squares
  - Full-Information Maximum Likelihood