Econometrics

Winter School @ Fudan SOE 2022

Course Code	ECON2130006
CourseTitle	Econometrics
Credit	3 **Credit Hours** 48 credit hours
Course Objectives	This course aims to provide students with a basic understanding of econometrics and its applications to both cross-sectional and panel data. After the course, students should be able to carry out simple regression analyses, including estimation and inference.
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Course Requirements:
Prerequisite courses:
Calculus I, Linear Algebra, Probability Theory, Statistics

Teaching Methods:
Lectures (online live)

Course Schedule:
1. Introduction
   a) What is Econometrics; Causal Inference.
   b) Stock and Watson Ch 1
2. Probability Theory and Statistics
   a) Random variables; Population and sample; Distributions; Moments.
   b) Stock and Watson Ch 2,3
3. Simple Regression Model

    a)   Linear regression models with one regressor; Ordinary Least Square (OLS) estimator; Assumptions of OLS; Measure of fit.

    b)   Stock and Watson Ch 4

4.   Inference

    a)   One-sided and Two-sided Hypotheses; Confidence interval; Binary explanatory variables; Gauss-Markov assumptions; t-test.

    b)   Stock and Watson Ch 5

5.   Regression Model with Many Regressors

    a)   Omitted variable bias; Multiple regressors; OLS for multiple regression models; Multicollinearity; Joint hypothesis testing.

    b)   Stock and Watson Ch 6,7

6.   Specifications

    a)   Nonlinear model; Polynomial and logarithm; Interaction between regressors;

    b)   Stock and Watson Ch 8

7.   Endogeneity

    a)   Causes of endogeneity; Endogeneity bias; Instrumental variables (IV); Two stage least square (2SLS) method.

    b)   Stock and Watson Ch 9,12

8.   Panel Data

    a)   Panel structure; Time series dimension; Fixed effect model; Estimation.

    b)   Stock and Watson Ch 10

9.   Binary Choice Models

    a)   Binary dependent variables; Linear probability model; Logit and Probit models; Maximum Likelihood Estimation (MLE).

    b)   Stock and Watson Ch 11

10. Introduction to Big Data Methods

The design of class discussion or exercise, practice, experience and so on:

There are four problem sets containing both theoretical exercises and practical problems to be solved using statistical software. These problem sets are designed to help the students understand the materials of the course more thoroughly.

Grading & Evaluation:

The course grade will be based on the performance on the problem sets to be given throughout the semester (80%), and a final exam (20%).

Late submission is NOT accepted. Academic integrity is expected. Failure to comply will result to immediate failure of the course and may be subject to further investigations/penalties by the university regulations.

Teaching Materials & References:

1. J. Stock, M. Watson, Introduction to Econometrics, Pearson, 2019

2. J. Wooldridge, Introductory Econometrics: A Modern Approach, Cengage Learning, 2019

3. J. Wooldridge, Econometric Analysis of Cross Section and Panel Data, Massachusetts Institute of Technology, 2010