

Econometrics I

Fudan University

Department: School of Economics

Course Code	ECON130240		
Course Title	Econometrics I		
Credit	5	Credit Hours	90
Course Nature	<input type="checkbox"/> Specific General Education Courses <input type="checkbox"/> Core Courses <input type="checkbox"/> General Education Elective Courses <input type="checkbox"/> Basic Courses in General Discipline <input checked="" type="checkbox"/> Professional Compulsory Courses <input type="checkbox"/> Professional Elective Courses <input type="checkbox"/> Others		
Course Objectives	After you finish the course, you are supposed to <ul style="list-style-type: none">● Know basic methods for estimating casual effects or testing economic theories using nonexperimental data.● Be able to conduct empirical analysis and evaluate the empirical work of others.		
Course Description	The goal of this course is to give students an introduction to econometrics with applications to empirical problems in economics and policy research. While some mathematical derivations will be presented, the emphasis will be on gaining an intuitive understanding of the principles of econometrics analysis. The course covers a total of 12 sections, which are 1) Introduction; 2) Review of probability and statistical inference; 3) Simple regression model; 4) Multiple regression model – Estimation; 5) Multiple regression model – Inference; 6) Asymptotic properties; 7) Heteroskedasticity; 8) Further specification issues; 9) Data problems; 10) Limited dependent variable models and sample selection corrections; 11) Panel data analysis; and 12) IV and 2SLS estimation. Both the linear and non-linear estimation methods will be taught.		
Course Requirements: Prerequisites: The core ideas of probability and statistics are needed to understand regression analysis and econometrics. I assume that you have taken an introductory course in probability and statistics. I will provide some introduction to it but please refresh your knowledge as needed.			

Teaching Methods:

Lecture, presentation, group discussion

Instructor's Academic Background:

MS. Zhi Wang received her PhD in Economics from Brown University in 2013 and joined the School of Economics at Fudan University shortly afterwards as an assistant professor. Her research focuses on the applications of microeconomics in the field of Urban Economics. Her research projects investigate: the relationship between the location of labor-force entry and wage growth; the spatial pattern of urban land development and the determinants; the effects and implementation of land use regulations; the effects of environmental regulations; the effects of school boundaries in urban China; the determinants of the spatial distribution of college admissions in China; the empirical evidence on peer effects; and the determinants and effects of industrial land policies.

Members of Teaching Team

Name	Gender	Professional Title	Department	Responsibility
Wang Zhi	Female	assistant professor	School of Economics	

Course Schedule**Chapter 1: Introduction** (3 hours)

- 1.1 What is econometrics?
- 1.2 What is the difference between econometrics and mathematical statistics?
- 1.3 What do the data used in empirical analysis look like?
- 1.4 What is the takeaway of this course?

Materials:

Chapter 1 in Wooldridge (2006)

Problem set 1 is assigned.

Chapter 2: Review of probability and statistical inference (3hours)

- 2.1 Random variables; probability distributions; random sampling
- 2.2 Estimators; unbiasedness, efficiency, and consistency

2.3 Asymptotic distribution; confidence intervals; hypothesis testing

Materials:

Appendices B and C in Wooldridge (2006)

Problem set 1.

Chapter 3: Simple regression model (6 hours)

3.1. Linear regression model

3.2. method of moment estimators

3.3. ordinary least square estimators (objective function, algebraic properties, unbiasedness, variances of OLS estimators and the estimates)

Materials:

Chapter 2 in Wooldridge (2006)

Problem set 1.

Chapter 4: Multiple regression model - Estimation (6 hours)

4.1. Motivation for the multiple regression model

4.2. The OLS estimators and the properties

4.3. The Gauss-Markov Theorem

Materials:

Chapter 3 in Wooldridge (2006)

Problem set 2 is assigned.

Chapter 5: Multiple regression model - Inference (6 hours)

5.1. The normality assumption

5.2. Testing three types of linear restrictions:

i) test individual parameter;

ii) test a single hypothesis involving more than one parameter;

iii) test multiple restrictions (e.g., overall significance test)

Materials:

Chapter 4 in Wooldridge (2006)

Problem set 2.

Midterm Exam

Chapter 6: Asymptotic properties (3 hours)

- 6.1. Asymptotic properties of estimators
- 6.2. Test statistics (normality assumption fails)

Materials:

Chapter 5 in Wooldridge (2006)

Problem set 2.

Chapter 7: Heteroskedasticity (3 hours)

- 7.1. Asymptotic properties of estimators
- 7.2. Heteroskedasticity robust inference
- 7.3. testing for Heteroskedasticity
- 7.4. weighted least squares estimation

Materials:

Chapter 8 in Wooldridge (2006)

Problem set 2.

Chapter 8: Further specification issues (3 hours)

- 8.1. Data scaling
- 8.2. Functional forms
- 8.3. Adjusted goodness of fit & selection of regressions
- 8.4. Predictions & residual analysis
- 8.5. Comparison between the log and level models
- 8.6. Dummy variables

Materials:

Chapter 6&7 in Wooldridge (2006)

Problem set 2.

Chapter 9: Data problem (3 hours)

- 9.1. Proxy variables
- 9.2. Measure error

Materials:

Chapter 9 in Wooldridge (2006)

Problem set 3.

Chapter 10: Limited dependent variable model (6 hours)

- 10.1. Linear probability model
- 10.2. Probit & Logit models;
- 10.3. Corner solution dependent variables
- 10.4. Poisson regression models; data censoring; sample selection

Materials:

Chapter 17 in Wooldridge (2006)

Problem set 3.

Chapter 11: Panel data (3 hours)

- 11.1. Difference-in-difference estimator
- 11.2. Time-invariant unobserved characteristics
- 11.3. Fixed effect estimator
- 11.4. Random effect estimator

Materials:

Chapter 13&14 in Wooldridge (2006)

Problem set 4.

Chapter 12: IV & 2SLS estimation (3 hours)

- 12.1. Causes of the biased OLS estimates
- 12.2. Instrumental variable strategy

Materials:

Chapter 15&16 in Wooldridge (2006)

Problem set 5.

Final Exam

Note: Every student is required to read the textbook before going to class.

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

Grading & Evaluation:

Class participation: 10%

5 Problem sets: 25% The problem sets will require the use of the statistical program Stata.

Midterm: 25%

Final: 40%

Passing grade: 60, below 60 = fail

Teaching Materials & References:

Your primary source for materials will be the provided notes and slides.

Reference:

Jeffrey Wooldridge, Introductory Econometrics: A Modern Approach, South-Western Cengage Learning, 2009

Stock, J., Watson, M., Introduction to Econometrics (2nd Edition), Addison-Wesley, 2006

Angrist, J.D., Pischke, J., Mostly Harmless Econometrics: An Empiricist's Companion Princeton University Press, 2009

陈诗一和陈登科,《计量经济学》,高等教育出版社,2019年

陈强,《高级计量经济学及Stata应用》(第二版),高等教育出版社,2014年