

Course Outline

Course ID: EE425 ECONOMETRICS 1

Semester 1/2022 (August 8 – November 26, 2022)

Number of Credit: 3 Credits

Prerequisite: MA216 (or MA211) and ST217 (or ST212)

Course Description: In this course, we will study applications of statistical and economic theories in analyzing economic data. This includes parameter estimation using the ordinary least squares (OLS) technique and hypothesis testing. The course covers single and multiple regressions. It also discusses problems encountered by OLS, including autocorrelation, heteroskedasticity, multi-collinearity and specification error. Other estimation techniques such as generalized least squares (GLS), maximum likelihood estimation (MLE) and the use of computer application in practice will also be covered.

Course Objectives: This course is the more advanced alternative to EE325 (Introductory Econometrics). It will focus on the theory that underpins standard econometric methods. Students will learn to derive simple theoretical results from standard principles. They will also learn to apply the knowledge to analyze actual datasets using a standard software such as STATA.

Class Time and Logistic

Class day: Tuesdays and Thursdays

Class time: 11:00 AM – 12:30 PM

Teaching Platform: Onsite – Room 203, 2nd floor, Faculty of Economics

Google Classroom: Class code **objv6ao**

** Online Platform will be used only when teaching onsite is not possible **

Optional online platform (Zoom – meeting ID: 982 606 9955, passcode: 425489)

Instructor: Name: Asst.Prof.Dr.Wanwiphang Manachotphong

Office Hours: By appointment

Email: wanwiphang@econ.tu.ac.th

Phone: 081-021-5664

Main Text: Wooldridge, J. M. *Introductory Econometrics: A Modern Approach*. 3rd ed. Thompson: South-Western, 2006.

Recommended Texts & Materials: Gujarati, D.N., and D.C. Porter, *Basic Econometrics*. 5th ed., N.Y., McGraw-Hill, 2009.

Suggested Readings: Gujarati, D.N., and D.C. Porter, *Basic Econometrics*. 5th ed., N.Y., McGraw-Hill, 2009.

Grading Criteria:

Homework	20%	
Paper Replication	15%	(Due date to be announced)
Midterm Exam	30%	(Tuesday, September 27th, 2022, noon – 2:00 PM)
Final Exam	35%	(Saturday, December 3rd, 2022, 1.30 PM – 4.30 PM)

***Late homeworks count as 50% of your actual marks.**

*If there is any handout or additional reading, it will be posted on Google Classroom prior to class. Students are responsible to review the topic ahead of the class for more effective learning.

Tentative Class Schedule:

Introduction

- What is econometrics?
- Methodology of econometrics
- Types of economic data
(Wooldridge, ch.1; Gujarati, ch. 1)

Review of Some Statistical Concepts

- Random variables and distributions
- Expectation, variance, covariance and correlation
- Estimators and desirable properties of estimators
(Wooldridge, Appendix B; Gujarati, Appendix A, pp.869-912)

Simple Regression Models

- Principle, assumptions and derivation of ordinary least squares (OLS) estimators
- Properties of OLS estimators
- Statistical inference
- Prediction
- Regression Through the Origin
(Wooldridge, ch. 2; Gujarati, chs. 2 – 6)

Multiple Regression Analysis (Estimation)

- Motivation
- Model and assumptions
- Estimation of parameters and properties of estimators
- Meaning of partial regression coefficients
- Measuring goodness of fit: R^2 and adjusted R^2
- The matrix approach to linear regression model
(Wooldridge, ch. 3; Gujarati: ch. 7, Appendix B, C)

Multiple Regression Analysis (Inference)

- Sampling Distribution of the OLS estimators
- Test on individual regression coefficients
- Testing the multiple linear restrictions
- Testing the equality of two regression coefficients
- Testing for equality or stability of parameters (Chow test)
- Prediction with general linear model
(Wooldridge, ch. 4; Gujarati: ch. 8)

===== MIDTERM EXAM ABOUT HERE =====

Multiple Regression Analysis (Extensions)

- Data scaling on OLS statistics
 - More on functional forms
- (Wooldridge, ch. 6, (6.1 and 6.2))

Dummy Variable Regression Models

- Describing Qualitative Information
 - Models with a single dummy independent variable
 - Using dummy variables for multiple categories
 - Interactions involving dummy variables
- (Wooldridge, ch. 7; Gujarati: ch. 15)

Matrix Algebra in Economics

- Summary of Matrix Operations
 - The Linear Regression Model in Matrix Form
- (Wooldridge Appendix D, Appendix E)

Heteroscedasticity Problem

- Nature and Consequences of heteroscedasticity for OLS
 - Testing for heteroscedasticity
 - Remedial measures (weighted least squares estimation)
- (Wooldridge, ch. 8; Gujarati, ch. 11)

Specification Errors and Data Problems

- Type of specification errors
 - Consequences of specification error
 - Tests of specification error
 - Errors of measurement
- (Wooldridge ch. 9; Gujarati: ch. 13)

Multicollinearity Problem

- Nature and Consequences of Multicollinearity
 - Detecting Multicollinearity
- (Wooldridge, ch. 3 (3.4); Gujarati, ch. 10)

Autocorrelation Problem

- Nature and Consequences of Autocorrelation, Serial Correlation
 - Testing for Autocorrelation
 - Remedial measures
- (Wooldridge, ch. 12 (12.1-12.3); Gujarati, ch. 12)

Instrumental Variables Estimation (if time allows)

- Motivation
 - The instrumental variables (IV) method
- (Wooldridge, ch.15; Dougherty, ch.8.1-8.3)

===== FINAL EXAM =====

Expected Learning Outcomes

ELO(s)	Major Emphasis	Minor Emphasis	Evaluation Method
1. Moral & virtue			
(1)	●		Do assignments and exams with integrity and honesty.
2. Knowledge			
(1)	●		Homework and Assignments
(2)	●		Exams
(3)	●		Paper Replication
3. Intellectual skills			
(1)	●		Paper Replication
4. Interpersonal skills & responsibility			
(1)	●		Homework and Assignments
(2)	●		Paper Replication
5. Numeral analytic, communication, and information technology skills			
(1)	●		Homework and Assignments
(2)	●		Paper Replication

* Major Emphasis: ●, Minor Emphasis: ○