B.E. International Program

Faculty of Economics, Thammasat University

Course Outline

EE 325 Introductory Econometrics (Section 046402)

Semester 2/2013 (January 13 –May 3, 2014)

Number of credits:	3 credits
Lecture Time:	Tuesdays & Thursdays, 12:30-2:00 PM
Lecture Venue:	Room 303, Faculty of Economics
Instructor:	Panit Wattanakoon
	Office: Room 15 (60^{th} building)
	E-mail: panit@econ.tu.ac.th
	Office hours: Tuesdays & Thursdays, 2:00-3:00 PM

Course Description: Application of statistical and economic theories in analyzing economic data, with emphases on parameter estimation techniques and applications of simple and multiple regression models to economic analyses. Use of computer application in practice is also covered.

Prerequisites: *EE211, EE212, MA216 (or MA211), and ST216 (or ST211).*
(Credits will not be awarded to students who are taking or have completed EE 425)

Aims and Objectives: This course provides an introduction to basic results and techniques of econometric theory. The emphasis will be on principles of econometrics and the application of econometric techniques rather than the derivation of theoretical statements. It is expected that at the completion of the course, students will be able to employ econometric investigation in their preparation for writing a seminar paper and to read critically empirical literature.

Instructor’s Note: This is an introductory course for econometric analysis. To understand and be able to apply it effectively, you need to learn some basic theories and the reasoning underlying an estimated equation. Some applied examples will be discussed in class but exercises in homework will provide various examples of econometric application for students. Students are expected to use an econometrics computer package (either Eviews or STATA) to do the homework. Homework assignments are expected to be handed on time. Late submission will be graded on the basis of 50% of the total scores of that assignment. More-than two-day late homework will not be accepted.

Assessment:

Quizzes	10 points
Assignments	10 points
Midterm Exam	30 points
Final Exam	50 points

Academic Honesty

You are expected to be honest in all of your academic work. Copying is plagiarism and will be treated as an honor code violation. Potential sanctions include failure in the course and suspension from the university.

Quizzes (10 points)

There will be altogether four quizzes, two before midterm and another two before final exam. The date for quizzes will be announced in advance. Absence from any quizzes is presumably resulted in earning zero in such quiz. There will be no make-up examination in any circumstances unless the absence is caused by *force majeure* and the instructor is willing to make a new quiz.

Required Textbooks:

*Gujarati, Damodar.N. and Porter, Down C. (2009) ***Basic Econometrics***. 5th ed. Singapore, McGraw-Hill/Irwin. (HB139 .G8 2009a)

Wooldridge, Jeffrey M. (2009) ***Introductory Econometrics: A Modern Approach.*** 4th ed. Mason, Ohio : South-Western Cengage Learning. (HB139 .W66 2009)

*main textbook

Recommended Texts for Further Study

Jame H. Stock and Mark W. Watson, ***Introduction to Econometrics***, 3rd Edition, Boston: Pearson Addison Wesley (2010)

Studenmund, A. H. ***Using Econometrics: A Practical Guide***, Harper Collins Publishers (2006 or Latest Edition)

William E. Griffiths, R. Carter Hill and George G. Judge, ***Learning and Practicing Econometrics***, John Willey & Sons (1993 or latest edition)

Jeffrey M. Wooldridge, ***Econometric Analysis of Cross Section and Panel Data***, MIT Press; 2nd edition (2010)

MarnoVerbeek, ***A Guide to Modern Econometrics***, Wiley (May 27, 2008)

Joshua D. Angrist and Jörn-Steffen Pischke, ***Mostly Harmless Econometrics: An Empiricist's Companion***, Princeton University Press (2009)

Course Outline

Part I Single-Equation Regression Models

1. Introduction and the Nature of Regression Analysis (January 14)

1.1 What is Econometrics?

1.2 Methodology of Econometrics

1.3 Regression, Causation and Correlation

1.4 Types of Data

Read: Gujarati: Introduction and Ch. 1; Woodridge: Ch.1

2. Review of Some Statistical Concepts (January 16, 21, and 23)

2.1 Summation and Product Operators

2.2 Sample Space, Sample Points, and Events

2.3 Probability and Random Variables

2.4 Probability Density Function (PDF)

2.5 Characteristics of Probability Distributions

2.6 Some Important Theoretical Probability Distributions

2.7 Estimators and Desirable Properties of Estimators

Read: Gujarati: Appendix A; Woodridge: Appendices A, B, C

3. Simple Linear Regression Model (January 28, 30 and February 4, 6, 11, 13 and 18)

3.1 Two-variable Regression Analysis: Some Basic Idea

3.1.1 The Concept of Population Regression Function (PRF)

3.1.2 The Meaning of the Term Linear

3.1.3 Stochastic Specification of PRF

3.1.4 The Significance of the Stochastic Disturbance Term

3.1.5 The Sample Regression Function (SRF)

3.2 Two-Variable Regression Model: The Problem of Estimation

3.2.1 The Method of Ordinary Least Squares

3.2.2 The Classical Linear Regression Model: The assumptions

3.2.3 Underlying the Method of Least Square

3.2.4 Precision of Standard Errors of Least-Squares Estimates

3.2.5 The Coefficient of Determination r^2: A Measure of "Goodness of Fit"

3.3 Classical Normal Linear Regression Model (CNLRM)

3.3.1 The Probability Distribution of Disturbances u_i

3.3.2 The Normality Assumption for u_i: Why the Normality Assumption?

3.3.3 Properties of OLS Estimators under the Normality Assumption

3.4 Two-Variable Regression: Interval Estimation and Hypothesis Testing

3.4.1 Statistical Prerequisites

3.4.2 Interval Estimation: Some Basic Ideas

3.4.3 Confidence Intervals for Regression Coefficients

3.4.4 Confidence Interval for σ^2

3.4.5 Hypothesis Testing: The Confidence Interval Approach

3.4.6 Hypothesis testing: The Test-of-Significance Approach

3.4.7 Hypothesis Testing: Some Practical Aspects

3.4.8 Regression Analysis and Analysis of Variance (ANOVA)

3.4.9 Application of Regression Analysis: The Problem of Prediction

3.5 Extensions of the Two-Variable Linear Regression Model

3.5.1 Regression through the origin

3.5.2 Scaling and units of measurement

3.5.3 Functional forms of regression model

Read: Gujarati: Ch.2-6; Woodridge: Ch. 2

4. Multiple Regression Analysis (February 20, 25 and 27 and March, 11)

4.1 Multiple Regression Analysis: The Problem of Estimation

4.1.1 The Three-Variable Model: Notion and Assumptions

4.1.2 Interpretation of Multiple Regression Equation

4.1.3 The Meaning of Partial Regression Coefficients

4.1.4 OLS Estimation of the Partial Regression Coefficients

4.1.5 The multiple coefficient of determination R^2 and Multiple Coefficient of Correlation

4.1.6 Simple Regression in the context of Multiple Regression: Introduction to Specification Bias

4.1.7 R2 and Adjusted R2

Read: Gujarati: Ch. 7; Woodridge: Ch. 3

4.2 Multiple Regression Analysis: The Problem of Inference

4.2.1 The Normality Assumption Once Again

4.2.2 Hypothesis Testing in Multiple Regression: General Comments

4.2.3 Hypothesis Testing about Individual Regression Coefficients

4.2.4 Testing the Overall Significance of the Sample Regression

4.2.5 Testing the Equality of Two Regression Coefficients

4.2.6 Restricted Least Squares: Testing Linear Equality Restrictions

4.2.7 The Chow Test

Read: Gujarati: Ch. 8; Woodridge: Ch. 4, 6

***** Econometric Program** (March, 13) *******

5. Dummy Variable Regression Models (March 18 and 20)

5.1 The Nature of Dummy Variables

5.2 ANOVA Models

5.3 ANOVA Models with Two Qualitative Variables

5.4 ANOVA Models with a Mixture of Quantitative and Qualitative Regressors

5.5 Dummy Variable Alternative to Chow test

5.6 Interaction Effects Using Dummy Variables

5.7 Use of dummy variable in time series data

5.7.1 Effect on intercept and slope

5.7.2 Seasonal analysis

5.8 Piecewise linear regression

Read: Gujarati: Ch. 9; Woodridge: Ch. 7

Part II Relaxing the Assumptions of the Classical Linear Regression Model

6. Multicollinearity:What Happens if the Regressors Are Correlated? (March 25 and 27)

6.1 The Nature of Multicollinearity

6.2 Estimation in the Presence of Perfect Multicollinearity

6.3 Estimation in the Presence of "High" but "Imperfect" Multicollinearity

6.4 Multicollinearity: Much Ado about Nothing?

6.5 Practical Consequences of Multicollinearity

6.6 Detection of Multicollinearity

6.7 Remedial Measures

6.8 Is Multicollinearity Necessarily Bad?

Read: Gujarati: Ch. 10; Wooldrige: Ch. 3

7. Heteroscedasticity: What Happens If the Error Variance Is Nonconstant? (April 1, 3 and 8)

7.1 The Nature of Heteroscedasticity

7.2 OLS Estimation in the Presence of Heteroscedasticity

7.3 The Method of Generalized Least Squares (GLS)

7.4 Consequences of Using OLS in the Presence of Heteroscedasticity

7.5 Detection of Heteroscedasticity

7.6 Remedial Measures

7.7 A Caution about Overreacting to Heteroscedasticity

Read: Gujarati: Ch. 11 and Appendix 11A; Wooldridge: Ch. 4

8. Autocorrelation: What Happens If the Error Terms Are Correlated? (April 10, 17 and 22)

8.1 The Nature of the Problem

8.2 OLS Estimation in the Presence of Autocorrelation

8.3 The BLUE Estimator in the Presence of Autocorrelation

8.4 Consequences of Using OLS in the Presence of Autocorrelation

8.5 Detecting Autocorrelation

8.6 Remedial Measures

8.7 Model Mis-Specification Versus Pure Autocorrelation

8.8 Correcting for (Pure) Autocorrelation: The Method of Generalized Least Squares (GLS)

8.9 The Newey-West Method of Correcting the OLS Standard Errors

Read: Gujarati: Ch. 12; Wooldridge: Ch. 8

9. Model Specification and Diagnostic Testing (April 24 and 29)

9.1 Model Selection Criteria

9.2 Types of Specification Errors

9.3 Consequences of Model Specification Errors

9.4 Test of Specification Errors

9.5 Errors of Measurement

Read: Gujarati: Ch. 13; Wooldridge: Ch. 12

Important Dates

Class Begins	January 13, 2014
Adding and Dropping Course	January 13-27, 2014
Midterm Exam Period	March 3 - 8, 2014 (No Lectures)
Midterm Exam	**Thursday, March 6, 2014; 12.30-2.00 PM**
Course Withdrawal with “W”	March, 19-24, 2014
Class Ends	May 3, 2014
Final Exam	**Tuesday, May 6, 2014; 09.00 AM-12.00 PM**