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Hunan University
STAT 25: Econometrics II

Professor: To be announced
Total contact hours: 54 hours
Credit: 4

Course Description

This course provides students with an in-depth understanding of the methodology and econometric modeling tools that are frequently used in the empirical economic research. The topics covered include linear and non-linear regressions, generalized methods of moments, non-parametric and semi-parametric techniques, time series and panel data models, models of limited dependent variables, IV estimation and simultaneous equation systems, survival analysis and program evaluation methods. The computer programming techniques that are needed to implement the above models will also be taught using SAS and STATA. In supplement to the lectures, we will also study many empirical papers during the seminar session of each class, which provides good examples of the above topics. In addition, you will get hands-on experience in conducting research by presenting an empirical project.

Required Material

Textbook: *Basic Econometrics*
Author: Damodar N. Gujarati, Dawn C. Porter
Edition: 5th Edition
Publisher: McGraw-Hill, Irwin

Supplemental Materials:

1. *Microeconometrics: Methods and Applications,* by Colin Cameron and Pravin K. Trivedi
2. *Econometric Analysis,* by William H. Greene (5th Edition, Prentice Hall)

Grading

Assignment	20%
Empirical Project Presentation 1	20%
Empirical Project Presentation 2	20%
Final Exam	40%

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	

Course Schedule

The course has 24 class sessions in total. All sessions are 2 hours and 15 minutes in length.
Note: the course outline and required readings are subject to change.

Class 1:
Chapter 12: Autocorrelation: What Happens If the Error Terms Are Correlated?
12.1 The Nature of the Problem
12.2 OLS Estimation in the Presence of Autocorrelation
12.3 The BLUE Estimator in the Presence of Autocorrelation
12.4 Consequences of Using OLS in the Presence of Autocorrelation
12.5 Relationship between Wages and Productivity in the Business Sector of the United States, 1960 - 2005
12.6 Detecting Autocorrelation
12.7 What to Do When You Find Autocorrelation: Remedial Measures
12.8 Model Mis-Specification versus Pure Autocorrelation
12.9 Correcting for (Pure) Autocorrelation: The Methods of Generalized Least Squares (GLS)
12.10 The Newey-West Methods of Correcting the OLS Standard Errors
12.11 OLS versus FGLS and HAC
12.12 Additional Aspects of Autocorrelation
12.13 A Concluding Example

Class 2:
Chapter 12: Autocorrelation: What Happens If the Error Terms Are Correlated? (Cont.)
Summary and Conclusions

Class 3:
Chapter 13: Econometric Modeling: Model Specification and Diagnostic Testing
13.1 Model Selection Criteria
13.2 Types of Specification Errors
13.3 Consequences of Model Specification Errors
13.4 Tests of Specification Errors
13.5 Errors of Measurement
13.6 Incorrect Specification of the Stochastic Error Term
13.7 Nested versus Non-Nested Models
13.8 Tests of Non-Nested Hypothesis
13.9 Model Selection Criteria

13.10 Additional Topics in Econometric Modeling
13.11 Concluding Examples
13.12 Non-Normal Errors and Stochastic Regressors
13.13 A Word to the Practitioner

Class 4:
Chapter 13: Econometric Modeling: Model Specification and Diagnostic Testing (Cont.)
Summary and Conclusions

Class 5:
Chapter 14: Nonlinear Regression Models
14.1 Intrinsically Linear and Intrinsically Nonlinear Regression Models
14.2 Estimation of Linear and Nonlinear Regression Models
14.3 Estimating Nonlinear Regression Models: The Trial-and-Error Method
14.4 Approaches to Estimating Nonlinear Regression Models
14.5 Illustrative Examples

Class 6:
Chapter 14: Nonlinear Regression Models (Cont.)
Summary and Conclusions
Assignment

Class 7:
Chapter 15: Qualitative Response Regression Models
15.1 The Nature of Qualitative Response Models
15.2 The Linear Probability Model (LPM)
15.3 Applications of LPM
15.4 Alternatives to LPM
15.5 The Logit Model
15.6 Estimation of the Logit Model
15.7 The Grouped Logit (Glogit) Model: Numerical Example
15.8 The Logit Model for Ungrouped or Individual Data
15.9 The Probit Model
15.10 Logit and Probit Models
15.11 The Tobit Model
15.12 Modeling Count Data: The Poisson Regression Model
15.13 Further Topics in Qualitative Response

Class 8:
Chapter 15: Qualitative Response Regression Models (Cont.)
Summary and Conclusions

Class 9:
Chapter 16: Panel Data Regression Models

16.1 Why Panel Data?
16.2 Panel Data: An Illustrative Example
16.3 Pooled OLS Regression or Constant Coefficient Model
16.4 The Fixed Effects Least-Squares Dummy Variable (LSDV) Model
16.5 The Fixed-Effect Within-Group (WG) Estimator
16.6 The Random Effects Model (REM)
16.7 Properties of Various Estimators
16.8 Fixed Effects versus Random Effects Model: Some Guidelines
16.9 Panel Data Regressions: Some Concluding Comments
16.10 Some Illustrative Examples

Class 10:
Chapter 16: Panel Data Regression Models (Cont.)
Summary and Conclusions

Class 11:
Chapter 17: Dynamic Econometric Models: Autoregressive and Distributed-Lag Models
17.1 The Role of "Time", or "Lag", in Economics
17.2 The Reasons for Lags
17.3 Estimation of Distributed-Lag Models
17.4 The Koyck Approach to Distributed-Lag Models
17.5 Rationalization of the Koych Model: The Stock Adjustment, or Partial Adjustment, Model
17.6 Another Rationalization of the Koyck Model: The Stock Adjustment, or Partial Adjustment, Model
17.7 Combination of Adaptive Expectations and Partial Adjustment Models
17.8 Estimation of Autoregressive Models
17.9 The Methods of Instrumental Variables (IV)
17.10 Detecting Autocorrelation in Autoregressive Models: Durbin h Test
17.11 A Numerical Example: The Demand for Money in Canada, 1979-I to 1988-IV
17.12 Illustrative Examples
17.13 The Almon Approach to Distributed Lag (PDL)

Class 12:
Chapter 17: Dynamic Econometric Models: Autoregressive and Distributed-Lag Models (Cont.)
Summary and Conclusions
Empirical Project Presentation 1

Class 13:
Chapter 18: Simultaneous-Equation Models
18.1 The Nature of Simultaneous-Equation Models
18.2 Examples of Simultaneous-Equation Models
18.3 The Simultaneous-Equation Bias: Inconsistency of OLS Estimators
18.4 The Simultaneous-Equation Bias: A Numerical Example

Class 14:
Chapter 18: Simultaneous-Equation Models (Cont.)
Summary and Conclusions

Class 15:
Chapter 19: The Identification Problem
19.1 Notations and Definitions
19.2 The Identification Problems
19.3 Rules for Identification
19.4 A Test of Simultaneity
19.5 Tests for Exogeneity

Class 16:
Chapter 19: The Identification Problem (Cont.)
Summary and Conclusions

Class 17:
Chapter 20: Simultaneous-Equation Methods
20.1 Approaches to Estimation
20.2 Recursive Models and Ordinary Least Squares
20.3 Estimation of a Just Identified Equation: The Method of Indirect Least Squares (ILS)
20.4 Estimation of an Overidentified Equation: The Method of Two-Stage Least Squares (2SLS)
20.5 2SLS: A Numerical Example
20.6 Illustrative Examples

Class 18:
Chapter 20: Simultaneous-Equation Methods (Cont.)
Summary and Conclusions
Empirical Project Presentation 2

Class 19:
Chapter 21: Time Series Econometrics: Some Basis Concepts
21.1 A Look at Selected U. S. Economic Times Series
21.2 Key Concepts
21.3 Stochastic Process
21.4 Unit Root Stochastic Process
21.5 Trend Stationary (TS) and Difference Stationary (DS) Stochastic Processes
21.6 Integrated Stochastic Processes
21.7 The Phenomenon of Spurious Regression
21.8 Tests of Stationarity
21.9 The Unit Root Test
21.10 Transforming Nonstationary Time Series
21.11 Cointegration: Regression of a Unit Root Time Series on Another Unit Root Time Series
21.12 Some Economic Applications

Class 20:
Chapter 21: Time Series Econometrics: Some Basis Concepts (Cont.)
Summary and Conclusions

Class 21:
Chapter 22: Time Series Econometrics: Forecasting
22.1 Approaches to Economic Forecasting
22.2 AR, MA, and ARIMA Modeling of Time Series Data
22.3 The Box-Jenkins (BJ) Methodology
22.4 Identification
22.5 Estimation of the ARIMA Model
22.6 Diagnostic Checking
22.7 Forecasting
22.8 Further Aspects of the BJ Methodology
22.9 Vector Autoregression (VAR)
22.10 Measuring Volatility in Financial Time Series: The ARCH and GARCH Models
22.11 Concluding Examples

Class 22:
Chapter 22: Time Series Econometrics: Forecasting (Cont.)
Summary and Conclusions

Class 23:
Overall review and preparation for the final exam

Class 24:
Final Exam

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Hunan University expects all students to do their own work. Instructors will fail assignments

that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:

— Attend all classes and be responsible for all materials covered in class and otherwise assigned;

— Complete the day's required reading and assignments before class;

— Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;

— Participate in class discussions and complete required written work on time;

— Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;

— While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.