



Nanchang University STAT 25: Econometrics II

Credit: 4

Contact Hours

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office hours. Each lecture session takes 2 contact hours in length; each tutorial session takes 3 contact hours in length; There will be a Q-A review session (3 contact hours) and Final Exam (3 contact hours) at the end of this term. This course has 72 contact hours in total.

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 STA. 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.

Textbook Information:

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

Supplemental Materials:

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

Grading

● Participation	10%
● Assignment	20%
● Empirical Project Presentation 1	20%
● Empirical Project Presentation 2	20%



● Final Exam 30%

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 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).

Note: the course outline and required readings are subject to change.

Class 1:

The Nature of the Problem; OLS Estimation in the Presence of Autocorrelation
 The BLUE Estimator in the Presence of Autocorrelation
 Consequences of Using OLS in the Presence of Autocorrelation
 Relationship between Wages and Productivity in the Business Sector of the United States, 1960 - 2005
 Detecting Autocorrelation
 Reading: Chapter 12: Autocorrelation: What Happens If the Error Terms Are Correlated?

Class 2:

What to Do When You Find Autocorrelation: Remedial Measures
 Model Mis-Specification versus Pure Autocorrelation
 Correcting for (Pure) Autocorrelation: The Methods of Generalized Least Squares (GLS)
 The Newey-West Methods of Correcting the OLS Standard Errors
 OLS versus FGLS and HAC; Additional Aspects of Autocorrelation; A Concluding Example
 Reading: Chapter 12: Autocorrelation: What Happens If the Error Terms Are Correlated?
 Summary and Conclusions

Class 3:

Model Selection Criteria; Types of Specification Errors
 Consequences of Model Specification Errors; Tests of Specification Errors
 Errors of Measurement; Incorrect Specification of the Stochastic Error Term
 Nested versus Non-Nested Models; Tests of Non-Nested Hypothesis
 Reading: Chapter 13: Econometric Modeling: Model Specification and Diagnostic Testing

Class 4:

Model Selection Criteria; Additional Topics in Econometric Modeling
 Concluding Examples; Non-Normal Errors and Stochastic Regressors
 A Word to the Practitioner
 Reading: Chapter 13: Econometric Modeling: Model Specification and Diagnostic Testing



Summary and Conclusions

Class 5:

Intrinsically Linear and Intrinsically Nonlinear Regression Models

Estimation of Linear and Nonlinear Regression Models

Estimating Nonlinear Regression Models: The Trial-and-Error Method

Reading: Chapter 14: Nonlinear Regression Models

Class 6:

Approaches to Estimating Nonlinear Regression Models; Illustrative Examples

Reading: Chapter 14: Nonlinear Regression Models

Summary and Conclusions

Assignment

Class 7:

The Nature of Qualitative Response Models; The Linear Probability Model (LPM)

Applications of LPM; Alternatives to LPM

The Logit Model; Estimation of the Logit Model

The Grouped Logit (Glogit) Model: Numerical Example; The Logit Model for Ungrouped or Individual Data

Reading: Chapter 15: Qualitative Response Regression Models

Class 8:

The Probit Model; Logit and Probit Models

The Tobit Model; Modeling Count Data: The Poisson Regression Model

Further Topics in Qualitative Response

Reading: Chapter 15: Qualitative Response Regression Models

Summary and Conclusions

Class 9:

Why Panel Data?; Panel Data: An Illustrative Example

Pooled OLS Regression or Constant Coefficient Model

The Fixed Effects Least-Squares Dummy Variable (LSDV) Model

The Fixed-Effect Within-Group (WG) Estimator; The Random Effects Model (REM)

Properties of Various Estimators; Fixed Effects versus Random Effects Model: Some Guidelines

Reading: Chapter 16: Panel Data Regression Models

Class 10:

Panel Data Regressions: Some Concluding Comments

Some Illustrative Examples

Reading: Chapter 16: Panel Data Regression Models

Summary and Conclusions

Class 11:



The Role of “Time”, or “Lag”, in Economics; The Reasons for Lags
Estimation of Distributed-Lag Models; The Koyck Approach to Distributed-Lag Models
Rationalization of the Koyck Model: The Stock Adjustment, or Partial Adjustment, Model
Another Rationalization of the Koyck Model: The Stock Adjustment, or Partial Adjustment, Model
Reading: Chapter 17: Dynamic Econometric Models: Autoregressive and Distributed-Lag Models

Class 12:

Combination of Adaptive Expectations and Partial Adjustment Models
Estimation of Autoregressive Models; The Methods of Instrumental Variables (IV)
Detecting Autocorrelation in Autoregressive Models: Durbin h Test
A Numerical Example: The Demand for Money in Canada, 1979-I to 1988-IV
Illustrative Examples; The Almon Approach to Distributed Lag (PDL)
Reading: Chapter 17: Dynamic Econometric Models: Autoregressive and Distributed-Lag Models
Empirical Project Presentation 1

Class 13:

The Nature of Simultaneous-Equation Models; Examples of Simultaneous-Equation Models
The Simultaneous-Equation Bias: Inconsistency of OLS Estimators
Reading: Chapter 18: Simultaneous-Equation Models

Class 14:

The Simultaneous-Equation Bias: A Numerical Example
Reading: Chapter 18: Simultaneous-Equation Models
Summary and Conclusions

Class 15:

Notations and Definitions; The Identification Problems
Rules for Identification; A Test of Simultaneity
Reading: Chapter 19: The Identification Problem

Class 16:

Tests for Exogeneity
Reading: Chapter 19: The Identification Problem
Summary and Conclusions

Class 17:

Approaches to Estimation; Recursive Models and Ordinary Least Squares
Estimation of a Just Identified Equation: The Method of Indirect Least Squares (ILS)
Estimation of an Overidentified Equation: The Method of Two-Stage Least Squares (2SLS)
2SLS: A Numerical Example; Illustrative Examples
Reading: Chapter 20: Simultaneous-Equation Methods



Class 18:

Reading: Chapter 20: Simultaneous-Equation Methods

Summary and Conclusions

Empirical Project Presentation 2

Class 19:

A Look at Selected U. S. Economic Times Series; Key Concepts

Stochastic Process ; Unit Root Stochastic Process

Trend Stationary (TS) and Difference Stationary (DS) Stochastic Processes

Integrated Stochastic Processes; The Phenomenon of Spurious Regression

Reading: Chapter 21: Time Series Econometrics: Some Basis Concepts

Class 20:

Tests of Stationarity; The Unit Root Test; Transforming Nonstationary Time Series

Cointegration: Regression of a Unit Root Time Series on Another Unit Root Time Series

Some Economic Applications

Reading: Chapter 21: Time Series Econometrics: Some Basis Concepts

Summary and Conclusions

Class 21:

Approaches to Economic Forecasting; AR, MA, and ARIMA Modeling of Time Series Data

The Box-Jenkins (BJ) Methodology; Identification; Estimation of the ARIMA Model

Diagnostic Checking; Forecasting

Reading: Chapter 22: Time Series Econometrics: Forecasting

Class 22:

Further Aspects of the BJ Methodology; Vector Autoregression (VAR)

Measuring Volatility in Financial Time Series: The ARCH and GARCH Models

Concluding Examples

Reading: Chapter 22: Time Series Econometrics: Forecasting

Summary and Conclusions

Class 23:

Case Study: Econometrics Application in IBM Date Analysis Program.

Class 24:

Overall review and preparation for the 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

Nanchang 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.