

AAE636: Applied Econometric Analysis I Fall 2010 Course Outline/Syllabus

Instructor:

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Class Time/Place: T, Th 9:30-10:45 B30 Taylor Hall

Lab

Office Hours: [T, W, Th 11AM-2PM], [by appt.]

Class WEB-Site: aae.wisc.edu/aae636

Required Textbook:

Wooldridge, Jeffrey. 2009 *Introductory Econometrics: A Modern Approach*, 4th Edition
ISBN-10: 0324581629 ISBN-13: 9780324581621

Stiegert, Kyle W. 2010. AAE636 Course Notes. Bob's Copy Shop

Supporting Textbooks

Gujarati, Damodar N., (2003) *Basic Econometrics*. 4th Edition. McGraw Hill, New York.

Kennedy, P., (2003) *A Guide to Econometrics*, 5th Edition, Blackwell Publishing, 1998

Hamilton, L. C. *Statistics with Stata*, 6th edition. Thomson-West. ISBN-10: 049510972X

Course Pre-Requisites: Students should have a minimum of one semester of derivative calculus, one junior-level (intermediate) undergraduate course in statistics, and one junior-level (intermediate) undergraduate course in microeconomics. This course will be fairly computer intensive using STATA econometrics software. Students are assumed to be proficient in the basics of EXCEL. Advanced undergraduate students with an interest in graduate studies are encouraged to take this course.

Course Objectives: This course provides an intensive introduction to methodologies for analyzing economic problems using quantitative methods. There will be an emphasis on linking microeconomic theory to estimation techniques, and interpreting the results of various quantitative exercises. At the end of this course, students should have become proficient in developing and interpreting linear multiple regression models as applied to a variety of economic problems and data. Additional emphasis is placed on procedures for dealing with economic data, developing a research proposal, and in developing critical thinking skills useful in applied economic analysis.

Grading

Final course grades will be determined using the following weights:

Course Evaluation

- 25%** - Homework Assignments
- 25%** - Midterm
- 30%** - Final Exam
- 20%** - Research Project

The research project grade is determined using the following rubric:

- (15 points) Introduction and motives for the research.
- (15 points) Integration of the literature review into the paper.
- (20 points) Model and pretests.
- (20 points) Results and inference.
- (15 points) Conclusions
- (15 points) Grammar, writing quality.

You should get started with your project. Think about a researchable problem, talk to your advisor(s), talk to fellow students, and read about public policy issues. If you can identify a topic, then review the literature using econlit or other search engines. Oftentimes, updating an older study or borrowing a model from a very similar study represents good strategies for writing your first paper in graduate school. Improving a project you worked on previously is also a good strategy. A good project to develop would be on a) something you already know about and/or b) something you could be willing to invest substantial time to learn about. Once you have a topic and a model, see if there are data to test your hypotheses. I will be available after every class to talk about your projects.

Note: students are required to review and become familiar with the materials at the Plagiarism.org Learning Center. A turnitin.com document, available at our website, contains similar information. Plagiarism is a serious issue, which has become more prevalent in the internet age. Your research paper should contain proper citations and all text, unless in quotes, should be your own.

Course Outline [Woolridge chapters or pages]

- 1 Regression Analysis [ch 1]**
 - 1.1 What is Econometrics?
 - 1.2 Economic Models/Relationships/Expressions
 - 1.3 Statistical Model
 - 1.4 The Meaning Of Linearity
 - 1.5 Data Types/Issues
 - 1.6 8-Step Approach to Economic Analysis
 - 1.7 Two-Variable Regression
- 2 MATH and STATS Primer [appendixes A, B, C]**
 - 2.1 Introduction
 - 2.2 Random Variables

- 2.3 Characteristics of Probability Distributions
- 2.4 Probability Distributions
- 2.5 Statistical Inference: Estimation
- 2.6 Inference: Hypothesis Testing
- 3 Two-Variable Regression Model [ch 2]**
 - 3.1 Ordinary Least Squares
 - 3.2 The OLS Model: Assumptions
 - 3.3 Standard Errors of Least-Squares Estimators
 - 3.4 Properties of Least-Square Estimators
 - 3.5 R^2 A Measure of Goodness of Fit
- 4 Matrices [appendix D]**
 - 4.1 Introduction
 - 4.2 Vectors
 - 4.3 Column Form of a Matrix
 - 4.4 Equality of Matrices
 - 4.5 Matrix Addition
 - 4.6 Matrix Subtraction
 - 4.7 Scalar Multiplication
 - 4.8 Matrix Multiplication
 - 4.9 Multiplication of Vectors
 - 4.10 Other Concepts
 - 4.11 Transposition of Matrices
 - 4.12 Symmetric Matrix
 - 4.13 Quadratic Form
 - 4.14 Matrix Inverse
 - 4.15 Linear Dependence and Rank
 - 4.16 Calculus and Matrices
 - 4.17 RV's and Var-Cov Matrices
 - 4.18 Multivariate Normal Distribution
- 5 The Multiple Regression Model [chs 3, 4]**
 - 5.1 The Setup
 - 5.2 Model Assumptions
 - 5.3 Least Squares Estimation
 - 5.4 Expected Value and Var-Cov Matrix
 - 5.5 Hypothesis Tests for Individual Parameters
 - 5.6 Confidence Intervals
 - 5.7 The R^2 measure
 - 5.8 The Adjusted R^2 Measure
- 6 Restrictions and Tests [ch 4]**
 - 6.1 Introduction
 - 6.2 General Linear Hypothesis
 - 6.3 Single Linear Hypothesis
 - 6.4 Linear Restrictions
 - 6.5 Testing $H_0 : \beta_2 = \beta_3 = \dots = \beta_k = 0$
 - 6.6 Added Variable Test
 - 6.7 The "Chow Test"
 - 6.8 Units of Measurement
 - 6.9 Prediction (Forecasting)

7 Dummy Variables [ch 7]

- 7.1 Examples of Model Variations
- 7.2 Multi-Classification and Interaction Terms
- 7.3 Varying Parameters on Independent Variables
- 7.4 Varying Intercept and Parameters
- 7.5 A Chow-type Test
- 7.6 Piecewise Regression Model

8 Multicollinearity

- 8.1 Consequence of Multicollinearity
- 8.2 Detecting Multicollinearity
- 8.3 Dealing with Multicollinearity
- 8.4 Omitted Variables Bias

9 Generalized Least Squares

- 9.1 Decomposition of Ω
- 9.2 The GLS Estimator of the β vector
- 9.3 Hypothesis Tests under GLS Estimation
- 9.4 General Linear Hypotheses Under GLS Estimation
- 9.5 R^2 Measure Under GLS Estimation
- 9.6 A Simple Example of GLS

10 Heteroscedasticity [ch 8]

- 10.1 Introduction
- 10.2 An Intuitive View
- 10.3 Detection of Heteroscedasticity
- 10.4 “Exact” GLS Estimation
- 10.5 “FGLS” Estimation Under Heteroscedasticity
- 10.6 Other Remedial Measures

11 Autocorrelation [selected parts from chs 10, 11, 12]

- 11.1 Introduction
- 11.2 First Order Autocorrelation
- 11.3 OLS Estimators under Autocorrelation
- 11.4 Testing for First-Order Autocorrelation
- 11.5 “Exact” GLS Estimation Under First-Order Autocorrelation
- 11.6 “FGLS” Under First-Order Autocorrelation
- 11.7 Distribution Form of β

12 Model Specification Issues [chs 6, 9]

- 12.1 Introduction
- 12.2 Omitted Variable Bias
- 12.3 Errors in Variables
- 12.4 Detecting Model Misspecification
- 12.5 Selecting Models

13 (not in notes packet)

Wooldridge, chapters 13, 14: panel data methods.

14 (not in notes packet)

Wooldridge, chapters 15, 16: IV and simultaneous equations models.

Bibliography

Wooldridge, Jeffrey. 2009 *Introductory Econometrics: A Modern Approach*, 4th Edition

Hamilton, L. C. Statistics with Stata, 6th edition. Thomson-West. ISBN-10: 049510972X

Kennedy, P., (2003) A Guide to Econometrics, 5th Edition, Blackwell Publishing, 1998.

Stigum, B. (2003) Econometrics and Philosophy of Economics. Princeton University Press. Princeton, NJ.

Spanos, Aris. Philosophy of Econometrics, working paper, May 2007.

Turnitin.com and Research Resources. "Preventing Plagiarism: Resources for Educators"

Name _____

Research Project:

_____ / (15 points) Introduction and motives for the research.

_____ / (15 points) Integration of the literature review into the paper.

_____ / (20 points) Model and pretests.

_____ / (20 points) Results and inference.

_____ / (15 points) Conclusions

_____ / (15 points) Grammar, writing quality.

_____ % Final Grade

Comments: