Econometrics II: Single Equation Econometric Models (E573)
Spring 2011 Syllabus

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Class meeting: TR 12:00-1:15 pm
NU 220
Office Hours: T 2:00-4:00 pm
and by appointment.

Section: 29376

Web page: http://liberalarts.iupui.edu/~mowilhel/

Course description: Econ 573 is the second semester of the core econometrics sequence. In Econ 573 students learn estimation and statistical inference methods for single equation models. The course focuses on methods to mitigate endogeneity problems that are obstacles to inferring a causal relationship from non-experimental data. The course covers linear models and the general approach to non-linear models, including maximum likelihood.

Learning objectives
1. Learn estimation and asymptotic statistical inference in single equation linear and non-linear models.
2. Learn standard econometric methods to mitigate endogeneity bias.
3. Apply these methods to heavily-used models in applied econometrics: panel data models, discrete choice models, Tobit models, and selection models.

Prerequisites
Students are assumed to be familiar with the materials covered in E 571. These include probability theory, distribution theory for random variables, and statistical inference theory of estimation and testing at the level of Casella and Berger’s book Statistical Inference and Greene’s book Econometric Analysis.

Required texts


Supplementary resources
Wooldridge’s book is a good technical exposition of econometrics, oriented toward a reader who will be applying econometrics. If you do not understand a technical point made by Wooldridge, consult the corresponding section of Greene’s book (referenced below).

Cameron and Trivedi (2005) is a good technical exposition oriented toward application, and it has a very useful (2010) companion book for Stata programmers. Baum (2006) is another good resource for doing econometric analysis in Stata: its coverage is less extensive than Cameron and Trivedi (2010), but focused on the methods taught in Econ 573.

Baum (2009) also has an excellent book about Stata programming. There is no econometrics in this book, but lots of time-saving ideas about programming.
The Stata Journal is a good reference for applied econometrics: articles explain econometric methods concisely and show you how to carry out those methods in Stata.


_____. 2010. *Microeconometrics Using Stata, Revised Edition*. College Station, TX: Stata Press.


**Grading policy**

Grades will be based on class attendance and participation (5%), problem sets (25% each), a midterm exam (30%), and a final exam (40%). Participation is assessed by evidence that you have done the required readings before the lecture and your active engagement during the in-class discussion.

Make-up exams will be offered for illness or emergency documented by a physician or other reliable source.

A problem set turned in late will receive one letter grade less per day late.

**Grading scale:**

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<tr>
<th>Letter grade</th>
<th>Percentage</th>
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<tr>
<td>A+</td>
<td>97-100</td>
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<td>A</td>
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**E-mail**

If I need to communicate with you between class meetings, I will use your e-mail addresses. Occasionally, we may use Oncourse to exchange large data sets.
Americans with Disabilities Act:
If you need any special accommodations due to a disability, please contact Adaptive Educational Services at (317)-274-3241. The office is located in CA 001E.

Academic Integrity:
Academic integrity means honesty, truthfulness, and originality, or put in the negative: not cheating, not fabricating data, and not plagiarizing.

Plagiarism occurs when you adopt, reproduce, or paraphrase the ideas, words, or statements of another person without appropriate acknowledgment. Quotes and paraphrases should include a complete reference. Facts and statistics should include references unless the information is common knowledge. When taking notes on an article or book you are reading, if you copy down words verbatim, put the words inside quotation marks. If your note is a paraphrase, put that inside quotation marks.

Plagiarizing includes copying a program written by a colleague student and passing the copy off as if you wrote it yourself. While I expect you to help each other with programming problems, in your final work use your own program code, not a copy of someone else's.

Finally, If you are not sure whether or not what you are about to do is plagiarism, ask me. Violations of academic integrity will result in a grade of F for the assignment, a report to the Dean of Student Affairs, and depending upon the violation, potential further consequences.

Students are expected to have read and understand the Student Code of Conduct, (http://www.iupui.edu/code/). Section G is “Academic Responsibilities and Misconduct.”

Computer activity
Students are responsible for activities on their computer accounts. Be sure to logoff the public computers when you leave them.

Course Outline
The readings from the Wooldridge text are to be done before class. Unless otherwise indicated, the other readings may be done after the lecture. Occasional supplemental readings will be assigned.

Part I: Single-equation linear models
Week 1 Ordinary least squares
Wooldridge Chapter 4.
Angrist and Pischke Chapter 3.1 and 3.2.

Week 2 Instrumental variables as a solution to endogeneity
Wooldridge Chapter 5.
Angrist and Pischke Chapter 4.1 and 4.2.1
Week 3  Instrumental variables: (a) Weak instruments. (b) Heterogeneous coefficients – Local Average Treatment Effect (LATE). (c) LATE versus Structural modeling: Internal validity versus External validity. This lecture is a very brief introduction instrumental variables when Heterogeneous coefficients and the LATE. LATE is covered in more detail in Econ 673.

Wooldridge Chapter 6.4
Angrist and Pischke Chapter 4.4, 4.6.1 and 4.6.4. Read before class.


Week 4  Additional single-equation topics: generated regressors/instruments, control function as a solution to endogeneity, specification tests, difference-in-differences estimator.

Wooldridge Chapter 6.

Part II: System of equations, linear models – Linear panel data models

Week 5  Linear systems: Ordinary least squares and generalized least squares

Wooldridge Chapter 7.

Week 6.1  Linear systems: Instrumental variables

This lecture is a very brief introduction to the generalized method of moments (GMM). GMM is the focus of Econ 670.

Wooldridge Chapter 8.1-8.3 and 8.4.1.
Angrist and Pischke Chapter 4.2.2.

Week 6.2  Linear panel data models

Wooldridge Chapter 10.1-10.4

Week 7.1  Linear panel data models (continued)

Wooldridge Chapter 10.5-10.7.
Angrist and Pischke Chapter 5.1-5.3

Week 7.2  Linear panel data models: topics

Wooldridge Chapter 11.1.2, 11.2-11.5

Week 8  Midterm 1 (March 3)
Part III: Nonlinear Estimation

Weeks 9 and 10  M-estimation, nonlinear least squares
   Wooldridge Chapter 12

Weeks 11 and 12  Maximum-likelihood estimation
   Wooldridge Chapter 13

Week 13  Binary response models (probit)
   Wooldridge Chapter 15

Week 14  Corner solution response models (tobit)
   Wooldridge Chapter 17

Week 15  Data problems: Censored data, sample selection, attrition
   Wooldridge Chapter 19