PA 692
Econometrics for Policy Analysts

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Office hours: MWF 1200-1250
Location of class: B&E 214

Course description

Maximum likelihood estimation, ordinary least squares (OLS) regression), instrumental variables (IV) regression, heteroscedasticity-consistent regression, fixed and random effects models, probit, logit and tobit models, and identification and two-stage least squares estimation of simultaneous equations models. Prereq: Any undergraduate statistics course, MPA, MPP, or PUAD program status for priority registration, other students with permission of instructor. (Same as ECO 692.)

Student Learning Outcomes. After completing the course, the student will be able to do the following tasks for each topic in the list of specific topics in statistics and econometrics on page 5 of this document: (1) derive the statistical concept or method mathematically, (2) apply the statistical concept of method to policy data, and (3) interpret the results of estimation as to both mathematical properties and policy analysis.

Course goals or objectives: Knowledge, comprehension, application, analysis, synthesis, and evaluation of statistical and econometric topics in the following list.

1. Basic statistics
   A. Moments
   B. Maximum likelihood
   C. Asymptotic theory
2. Basic regression and the following complications of regression
   A. Specification of explanatory variables
   B. Generic heteroscedasticity
   C. Autocorrelation
   D. Fixed and random effects
   E. Instrumental variables
3. Simultaneous equations models
   A. Identification
   B. Two-stage least squares
4. Limited dependent variable models.
   A. Probit
   B. Logit
   C. Tobit

D. Selection bias models

Required materials:
Introductory Econometrics by Jeffrey M. Wooldridge and class handouts provided before and during the class.

Course Assignments:
Two exams of 100 points each.
Five graded problem sets of 100 points each.
One individual paper at 100 points.

Summary Description of Course Assignments:

All assignments practice knowledge, improve comprehension, apply methods, analyze methods and results, synthesize methods and policy analysis, and evaluate methods and estimates of statistical and econometric methods.

Course Grading:

Grading scale for all graduate students
80-100% = A
60-79% = B

Final Exam Information:
The final exam is a take-home exam with open book and notes.

Mid-term Grade:
No undergraduates take this course, so this is not required.

Course Policies:

Submission of assignments:

Due dates for assignments are stated when the assignments are handed out or otherwise distributed and depend on the speed of the course and the need for review of technical topics in statistics or econometrics. In no case, shall an assignment be due less than one week from its distribution.

Attendance Policy:

Attendance is not required. The instructor prefers students who are ill to stay at home and obtain appropriate medical care.

Excused Absences:

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences:

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of *Student Rights and Responsibilities* (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Schedule of Specific Topics	Chapter or Appendix in Wooldridge
Matrix algebra	D
Probability	B
Binomial, normal, lognormal, truncated normal, gamma distributions	
Moments: mean, variance, skewness, kurtosis, covariance	
Asymptotic distribution theory	
Samples and point estimates	C.1-C.2
Asymptotic properties (includes convergence and the delta method)	C.3
Methods of estimation (includes MLE)	C.4
Interval estimates and hypothesis tests	C.5-C.6
Ordinary least squares (OLS)	
Introduction	2 (all), 3.1
Estimation, goodness of fit, R square	3.2, E.1-2
Standard assumptions, irrelevant or omitted variables	3.3
Finite sample properties, multicollinearity	3.4-3.5, E.3
Partitioned regression	In class
Hypothesis tests	4 (all)
Large sample properties	5, E.4
Complications of OLS	
Data scaling, log or linear, outliers	6
Structural change, dummy variables	7
Heteroscedasticity	8
Specification of regressions, model selection, missing data	9
Autocorrelation	12
Pooled time-series cross-sections	13
Fixed and random effects	14
Errors in variables and instrumental variables	15
Simultaneous equation models	16
Identification, estimation	
Probit, logit, tobit, poisson, truncated or censored models	17
This includes selection bias models.	