

ECON435
INTERMEDIATE ECONOMETRICS

David Mushinski
Office: Clark C-316
Email address. david.mushinski@colostate.edu

Time: TR 11:00 am – 12:15 pm
Room: PHYSL 243

Course Objectives

This course extends the analysis in the introductory econometrics course (ECON335). The extensions start with presentation of econometric models which broaden the assumptions of the (Multiple) Linear Regression Model. These models are known as Generalized Linear Regression Models. We then turn to panel data techniques, and to issues which arise when a right-hand side variable is endogenous (correlated with the disturbance in an equation). The analysis of panel data techniques leads us to a discussion of Treatment Effect techniques used to analyze the impact of public policies. These techniques, which have been popular in economics in the last twenty years, represent a different approach to empirical economic analysis. We will then turn to limited and qualitative dependent variable econometric models, such as the Probit, Logit, and Tobit models.

Students will receive hands-on experience by applying what they have learned in class using the STATA software language. Understanding how to estimate the models learned in class and undertake relevant hypothesis tests using STATA will be an important part of the course.

Upon completion of this course, a successful student should

- 1) be able to explain how the Generalized Linear Regression Model and the Generalized Least Squares estimator relate to the Linear Regression Model (LRM),
- 2) understand how a Panel Data Model relates to the LRM and the benefits of panel data relative to the cross-section data,
- 3) understand how to measure a Treatment Effect,
- 4) understand and be able to analyze econometric estimation techniques when the dependent variable in a model is either qualitative or limited, and
- 5) be able to implement in STATA the econometric estimators and hypothesis tests learned in class.

Textbook

Wooldridge, Jeffrey M. (2020). *Introductory Econometrics: A Modern Approach* (7th ed). Cengage Learning, Boston, MA.

There are several ways in which you may obtain access to the materials in the Wooldridge text. There is a module in the course Canvas web site which describes how to access the course materials.

I may make some of my class notes (*Notes*) available to students. The notes are designed to supplement assigned materials. The notes have not been proofread. Use of the notes is optional. I make my notes available to help the students who will benefit from them. You do not have to use the notes if they do not help you learn the materials.

Econometric Software

We will use the STATA software package in the course. STATA is available in the student computer lab in the Clark Building (Clark C-141). Because access to the Clark Computer Lab may not be possible during the Spring 2021 semester (because of the Covid-19 pandemic) the Economics Department will purchase a short-term (6-month) license for STATA IC for each student in the course. This purchase is NOT standard and applies only to the Spring 2021 semester. I will give you information in class on getting a license.

Contact Hours: Each week students will be expected to spend the following time on this course

	<i>Activity Contact Hours per Week</i>
Attend Class	3
Review Assigned Readings prior to class	6
Review Class Notes after class, and prepare for tests	<u>3</u>
Total	12

Grading

There will be three examinations (each worth 25% of the course grade) and three problem sets (each worth 8 1/3 % of the course grade). The final exam is scheduled for Wednesday May 12 between 6:20 and 8:20 pm.

For extra credit equal up to 10% of the course grade, you may write a short paper (approximately 10 pages long) in which you undertake an econometric analysis of an economic theory. I will give you more details about the paper as the semester progresses.

Accommodations for Students with Disabilities: University policy regarding students with disabilities is defined at <http://rds.colostate.edu/>

Virtual Office Hours (Canvas Conference): MW 11 am – 12 pm and by appointment.

Important information for students on COVID-19:

All students are required to follow public health guidelines in any university space, and are encouraged to continue these practices when off-campus(es). Students also are required to report any COVID-19 symptoms to the university immediately, as well as if they have potentially been exposed or have tested positive at a non-CSU testing location. If you suspect you have symptoms, please fill out the COVID Reporter (<https://covid.colostate.edu/reporter/>). If you have COVID symptoms or know or believe you have been exposed, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you; if you report to your instructor that you will not attend class due to symptoms or a potential exposure, you are required to also submit those concerns through the COVID Reporter. If you do not have access to the internet to fill out the online COVID-19 Reporter, please call (970)491-4600.

If you report symptoms or a positive test, your report is submitted to CSU's Public Health Office. You will receive immediate, initial instructions on what to do and then you will also be contacted by phone by a public health official. Based on your specific circumstances, the public health official may:

- choose to recommend that you be tested and help arrange for a test
- conduct contact tracing
- initiate any necessary public health requirements or recommendations and notify you if you need to take any steps

If you report a potential exposure, the public health official will help you determine if you are at risk of contracting COVID.

For the latest information about the University's COVID resources and information, please visit the **CSU COVID-19 site** (<https://covidrecovery.colostate.edu/>).

Online Delivery of Course Materials

Because this course will be delivered (at a minimum) online during the first week of classes and starting the week of April 19 through the end of the semester there are certain technological requirements for completion of this course. The technology requirements for this course are listed below.

Hardware

- A Windows or Macintosh computer with at least 2 GB of RAM and a fast, reliable broadband Internet connection (e.g., cable, DSL).
- Recommended computer monitors and/or laptop screen size of 13-inches or larger for optimum visibility of course material.
- Computer speakers or headphones to listen to recorded content.
- A webcam or other camera may also be necessary for proctoring services used in this course.
- Enough space on your computer to
install the required and recommended software and,
save your course assignments.

Software

- Web browsers
- Firefox generally works well with CSU websites - free download
- Chrome: free download
- Adobe Acrobat Reader (free download)
- Flash Player (free download)
- Microsoft Office (free download through CSU)

Online Exams

Because there will be at least one on-line exam in this course, you must have appropriate technology for taking an on-line exam. *Respondus Monitor* (RM) will be the primary monitoring service used. To use RM, students must have (i) a Lockdown Browser, and (ii) a computer camera. External cameras may be purchased online. You may find out about everything you need to know about using RM at <https://tilt.colostate.edu/TestingCenter/Respondus>.

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Academic Integrity

The University takes academic integrity seriously. At a minimum, academic integrity means that no one will use another's work as their own. Of course, academic integrity means more than just avoiding plagiarism. It also involves doing your own reading and studying. It includes regular class attendance, careful consideration of all class materials, and engagement with the class and your fellow students. Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community.

Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, we will ask to you sign the CSU Honor Pledge as part of completing all of our major assignments. While you will not be required to sign the honor pledge, we will ask each of you to write and sign the following statement on your papers and exams:

"I have not given, received, or used any unauthorized assistance."

Course Outline

Topic	Reading
I. Introduction & Review of the (Multiple) Linear Regression Model (LRM)	Parts of Chs. 3, 5 & 7.
II. Extensions of the LRM: the Generalized Linear Regression Model	
(A) Heteroskedasticity	Ch. 8
(B) Serial Correlation and Time Series Data	Chs. 10 & 12
III. Panel Data Methods	Chs. 13 & 14
IV. Instrumental Variables Estimation and Two-Stage Least Squares	Ch. 15
V. Measuring Treatment Effects	Chs. 2 §7, 3 §7e, 4 §7, 13 §§2,4 & notes
VI. Simultaneous Equation Models	Ch. 16
VII. Limited Dependent Variable Models and Sample Selection Corrections	Ch. 17 & (possibly) notes.