

**ECO499: Independent Study in Introductory Econometrics
Spring 2016**

Instructor Information

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Course Description

An introduction to regression analysis and its application to economic and business research. Topics include using secondary data sources, simple and multiple regression, forecasting, time series analysis, and interpretation and communication of results. The course develops various empirical techniques and culminates with a final research report.

Learning Objectives

For successful learning, it is important that you understand why we do the reading, lectures, assignments, etc, we do. Everything we do in this class is meant to achieve the learning objectives below. It would be useful for you to pay careful attention to what learning objectives the lectures and assignments are meant to achieve.

1. Construct, estimate, and interpret regression models to identify relationships between explanatory and outcome variables.
 2. Construct, estimate, and interpret various functional forms for regression models, including the use of binary variables, log and quadratic functions, and interaction effects.
 3. Identify assumptions and possible shortcomings to estimated regression models.
 4. Identify patterns and relationships among macroeconomic and financial variables by estimating and interpreting elementary time series regression models.
 5. Apply econometric models to data using the statistical package *R*.
 6. Apply econometric models to economic data as part of a significant research project culminating in a formal paper and presentation.
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Course Resources

Textbook: Wooldridge, Jeffrey M. (2016). *Introductory Econometrics*. Sixth Edition.

R and *RStudio*: Open source (free to download and install) statistical software to be used in class and for homework assignments and projects.

Desire2Learn (D2L): Course content and grades will be posted on D2L.

Office Hours

Appointments for office hours with Prof. Mary Hamman can be made by visiting <https://mhamman.youcanbook.me> and with Prof. James Murray's by visiting <https://murraylax.youcanbook.me>.

Homework Assignments

There will be several graded homework assignments assigned throughout the semester. Some involve applying the tools learned in class to problem sets with real data. Some homework assignments involve a written component asking you to read and critique econometric studies.

Research Paper

A major goal of this class is to be able to apply econometric tools to current data to answer an original research question in economics. The course will involve a semester-long research project. Early in the semester we will work on identifying a topic and dataset. You will apply new econometric tools that we learn in the class to your dataset as we cover them. As the semester proceeds, you will be expected to focus your research question and closely tie it to your decisions for what type of analysis to conduct. By the end of the semester, your work will culminate in a formal research paper. Below are some additional guidelines and expectations for the project:

1. Your project results in an *empirical* economics paper, which means it answers a question of interest in economics based on applying statistical methods to data, and letting the results from the data support your conclusion.
2. A good paper should be interesting to read. To make your paper interesting, introduce the question quickly and motivate it. Why is your question interesting? Why do we not have an adequate answer to it yet? What will the reader learn that is not already known if he or she decides to continue reading it?
3. Your paper should include a short literature review (either as part of the introduction or a separate section) that describes sufficient background for the audience to understand the purpose and context of your work and be used to help motivate your research question. You should cite primarily peer-reviewed academic articles from economics journals.
4. Usually, research papers make *marginal* contributions. Your paper will not solve a big problem, but will instead make an incremental step toward better a understanding of some specific aspect of the literature you are citing.
5. Empirical work in economics places a great deal of emphasis on *causal* relationships. While causal identification may be difficult, impractical, and sometimes impossible, your paper should discuss how published work related to your project has addressed identification.
6. Make your literature review, methodology, and results interesting to read. These sections should tell a story and proceed with a clear purpose. Avoid making these sound like a letter to your parents from summer camp, "Then we did this... then we did this... then we did this..."
7. A good paper should be easy to read. Make the organization of the paper clear and your text concise. Avoid repeating the same ideas in multiple sentences when a single sentence will do. Avoid repeating ideas in multiple areas of your paper unless it is necessary; this hurts both organization and conciseness.
8. The paper should be approximately 10-12 pages in length; double spaced (not 2.2 spaced, 1.5 spaced...), excluding tables, figures, and references; twelve point Times New Roman font; and have exactly one inch margins. The page length requirement will not be strictly enforced, but serves as a guide to you for how long a paper you should expect to write to adequately meet all other expectations for the paper. The formatting on spacing, font, and margins will be strictly enforced.
9. Plagiarism will not be tolerated. This constitutes academic misconduct and will be handled accordingly.
10. Below are research paper milestones. Deadline dates and times will be determined with Professor Hamman.
 - (a) **One page research proposal** that includes the following: (1) a one-sentence thesis statement or research question; (2) a short description of relevant background information including at least two citations of peer-reviewed articles from economics journals; (3) a description of your dataset including the source and some of the variables that you are likely to use; (4) a very brief and broad explanation for the relationships you expect to look for among the variables; and (5) a discussion of identification issues in the existing literature.
 - (b) **Annotated bibliography** that includes bibliographic information, summary, and purpose for six sources that you are likely to cite in your paper. At least four of these must be published papers in academic, peer-reviewed journals.
 - (c) **Rough draft of introduction and literature review.** There is no requirement on the exact organization of these sections. You may have these as two separate sections, as a combined section, or another organization that you find appropriate for your project.
 - (d) **Rough draft of your methodology and results.** There is no requirement on the exact organization of these sections. You may have these as two separate sections, as a combined section, or as multiple sections organized by the type of question you answer or the type analysis you conduct.
 - (e) **Rough draft of the conclusion / discussion section.** The final section should go into detail discussing the meaning and importance of the statistical results. Be sure to tie this discussion in with the purpose of your paper as described in the introduction.
 - (f) **Final paper**

Eagle Alert System

This class will be participating in the UW-L Eagle Alert system through WINGS. The Early Alert system is designed to promote student success. If we notice that you are experiencing difficulties early in the semester (e.g., low assignment scores, poor attendance, minimal engagement in the classroom), we may enter feedback into the program and you will receive an email indicating that feedback has been left. We may also enter positive feedback encouraging you to think about additional opportunities. You will be able to access the feedback through your student center in WINGS. We encourage you to meet with us and use one or more of several helpful campus resources listed here <http://www.uwlax.edu/studentssuccess/>.

E-mail Guidelines

I insist on the following e-mail etiquette rules (many of these are also recommended by the College of Business Administration). Failure to adhere to these guidelines will result in a reply with a friendly reminder to follow these e-mail guidelines.

- Allow one business day to elapse before expecting a reply.
- Questions sent by e-mail should be able to be answered with only a few words, such as 'yes' or 'no' questions. Questions whose answers involve explaining class material are not appropriate over e-mail. For answers to these questions you should come to office hours.
- Always include a subject that is brief but still has sufficient detail, *including the class your are in (ECO 499: Econometrics)*.
- Look at your class notes and syllabus before sending an e-mail. Do not ask a question whose answer is on the syllabus or announced in class (unless you missed class for a legitimate reason).
- Always spell check, grammar check, and re-read your e-mail before sending it.

Students with Disabilities

Any student with a documented disability (e.g. ADHD, Autism Spectrum Disorder, Acquired Brain Injury, PTSD, Physical, Sensory, Psychological, or Learning Disability) who needs to arrange academic accommodations should contact The ACCESS Center (165 Murphy Library, 608-785-6900, ACCESSCenter@uwlax.edu) and meet with an advisor to register and develop an accommodation plan. In addition to registering with The ACCESS Center, it is the student's responsibility to discuss their academic needs with their instructors. You can find out more about services available to students with disabilities at The ACCESS Center website: <http://www.uwlax.edu/access-center>.

Veterans and Active Military Personnel

Veterans and active military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to me. For additional information and assistance, contact the Veterans Services Office (<http://www.uwlax.edu/veteran-services/>). Students who need to withdraw from class or from the university due to military orders should be aware of the military duty withdrawal policy (<http://catalog.uwlax.edu/undergraduate/academicpolicies/withdrawal/#military-duty-withdrawal-university>).

Mandatory reporter statement

As a faculty member of the University of Wisconsin-La Crosse, we are mandated reporters of sexual harassment (including sexual violence). This means that faculty are obligated to disclose any detailed or specific information we receive about such incidents involving a member of this campus while that person is a member of this campus, regardless of whether the incident takes place on campus or off. If you believe you or another member on campus may be a victim of sexual harrassment, you should know your options under the Title IX guidelines. There are confidential reporters available to students at UW-L where you can have this discussion. The contact in Student Life is Ingrid Peterson, Violence Prevention Specialist, at (608) 785-8062 or ipeterson@uwlax.edu. We are also happy to help direct you to counseling and support services. Simply ask us to assist you in locating a confidential reporter and we will help you to do so.

Academic Misconduct

Academic misconduct is a violation of the UW-L Student Honor Code and is unacceptable. We expect you to submit your own original work and participate in the course with integrity and high standards of academic honesty. The UW-L Student Honor Code can be found online at <http://catalog.uwlax.edu/undergraduate/academicpolicies/studentconduct/>. In the event a student is caught committing academic misconduct, we will pursue the harshest penalties allowed according to the UWS 14 Student Academic Disciplinary Procedures, which can be found here <http://www.uwlax.edu/Student-Life/Student-handbook/#14>.

Schedule of Topics

1. Introduction / R overview

- *Try R* online tutorial: <http://tryr.codeschool.com/>
- Review of hypothesis testing and confidence intervals for single and two variables, interpretation
 - Reading: Handout tutorials to be posted on D2L
- Economic data, economic modeling.
 - Reading: Wooldridge, Chapter 1
 - Homework: Problems 2 and C4 on pages 15-16.

2. Simple Regression

- Topics:
 - Estimating and interpreting the simple model
 - Functional form
- Reading: Wooldridge, Chapter 2, pages 20-24, 27-40.
- Homework: Problems 5, 6, and C7

3. Multiple Regression

- Topics:
 - Estimating the model, interpreting results
 - Variance decomposition
 - Assumptions and issues using multiple explanatory variables
- Reading: Wooldridge, Chapter 3, pages 60-64, 65 (bottom of page) - 68, 70-86; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

4. Hypothesis testing in Regression Analysis

- Topics:
 - T-tests and confidence intervals on regression coefficients
 - F-test for overall model fit
 - F-test for multiple exclusions
 - Testing general linear restrictions
- Reading: Wooldridge, Chapter 4, pages 105-124, 127-135; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

5. Regression Model Specification

- Topics:
 - Standardized regression
 - Functional forms: logs and quadratics
 - Interaction terms and marginal effects
- Reading: Wooldridge, Chapter 6, pages 171-183; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

6. Binary (Dummy) Variables

- Topics:
 - Single dummy variable
 - Dummy variables for multiple categories
 - Interact with dummies
 - Dependent dummy: linear probability model
- Reading: Wooldridge, Chapter 7, pages 205-221; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

7. Heteroskedasticity

- Topics:
 - Interpreting and testing for heteroskedasticity
 - White correction for heteroskedasticity
- Reading, Wooldridge, Chapter 8, pages 243-254; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

8. Linear probability model

- Topics:
 - Dependent dummy variable interpretation
 - Correcting for heteroskedasticity
- Reading: Wooldridge, Chapter 7, pages 224-229 and Chapter 8, pages 265-267; Handout tutorials to be posted on D2L
- Homework to be posted on D2L

9. Panel regression models

- Topics:
 - Pooled panel with time dummies
 - Differences-in-differences
 - Fixed effects regression models
- Reading: Wooldridge, Chapter 13, pages 403-412 and Chapter 14, pages 435-437; Handout tutorials to be posted on D2L
- Homework to be posted on D2L