**ECON 453 – Econometrics**
**Fall 2023**
**TR 9:30 – 10:45, ALB 102**

Instructor: Dr. Dan Hickman
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Cross-listed Course: STAT 433

Course Prerequisites: STAT 251 or STAT 301

Course Description
The goal of this course is to introduce you to the practical application of econometric techniques. Primarily, we will focus on applications of multiple linear regression analysis in business and social science settings. While we will discuss the theoretical and mathematical foundations, the effective use of econometric procedures is emphasized. We will also discuss effective communication of the results of econometric analysis. This course will involve learning the basic tools required to complete analysis using the software computer program *gretl*. The knowledge gained in this course will be demonstrated by your completion of a comprehensive project on a topic of particular interest to you.

Learning Goals for the Course
By the end of this course, students should be able to:

1. Properly interpret the results of multiple linear regression analysis. This includes making predictions based on the results, providing intuition as to the practical application of the results, and assessing the statistical strength of the model.
2. Confidently construct datasets that are appropriate to answer the question of interest and be able to work with real-world data in an efficient manner.
3. Correctly specify an econometric model based on the nature of the data available, the question(s) of interest, and other factors.
4. Address the validity of econometric models and test for common problems that arise from violations of model assumptions.
5. Critically analyze research in Business, Economics, Social Sciences, etc. that utilizes econometric methods.
6. Effectively communicate the results of econometric analysis to a broad audience. This involves learning to adequately write about statistical outcomes, as well as presenting numerical results in a clean manner.

Optional Textbook(s)
**There are no required textbooks for this class. In previous semesters, very few students have purchased a textbook in the course.**

Wooldridge, Jeffrey. *Introductory Econometrics: A Modern Approach* (Any Edition)

If you would prefer to have a textbook available, you should be able to find a less expensive copy of an old edition of this text, and that will be perfectly fine for the purposes of this course. This is the textbook we will most closely align with, but any "introduction to Econometrics" type of textbook should work if you have access to a different one. I also have a few of these books that you could borrow from time to time as needed.

Lecture

The lectures for this class will involve a combination of whiteboard lectures, PowerPoint slides, and working together/demonstrating in Excel and *gretl*. You should come to class prepared to take notes. When there are lecture slides, they will be posted to Canvas after class. However, it will generally be a good idea to attend as often as possible. I can work with you to catch up on days where you need to miss class, but you will not typically be able to catch up simply by looking through Canvas. I believe that the best way to learn these kinds of methods is to practice them together, so your attendance and engagement will be necessary to achieve our learning goals.

In addition to learning the "textbook" material, I will often bring in examples of current research studies or news items that pertain to general econometric issues. While I will not ask questions about specific results from these items (for example: "By what percentage did teen childbearing rates drop after the show *16 and Pregnant* become popular?"). I may, however, ask general questions about them on assignments and exams (for example: "According to our discussion in class, a recent study found that increased viewership of the show *16 and Pregnant* caused teen childbearing rates to: (a) decrease, (b) increase, (c) not change, (d) all of the above").

Technology

This course will have a Canvas site this semester. Supplementary lecture materials, datasets, readings, assignments, study guides, and other assorted materials will be posted there. Exams will be completed through Canvas. Your grades will also be posted on this site.

We will also be working with the statistical program *gretl* in this class. This program is free to download and (relatively) straightforward to use. We will often work on examples in class to help you learn both the material and the software. I will also post several tutorials to help you with some of the methods.

We may occasionally do some work in Microsoft Excel. I assume many of you have a basic understanding of how to work in Excel, which will be sufficient for our purposes. If at any time you feel you need extra help with this program, please feel free to come by my office.

STATA is a statistical package that is currently popular among economists. I may occasionally work in this program in class to give you an idea of what some of the more advanced statistical programs can do. Depending on your interests, you are encouraged to consider investing in and beginning to work with a program such as Minitab, R, SAS, STATA, or SPSS.

Grading

- Problem Sets — 30 percent
- Econometric Project (due Final Exam Week) — 20 percent
- Exam 1 (Thursday October 12th) — 20 percent
- Exam 2 (Thursday November 30th) — 20 percent
- In-Class Assignments/Participation — 10 percent

Grades will follow the standard scale:

- A 89.5-100%
- B 79.5-89.4%
- C 69.5-79.4%
- D 59.5-69.4%
- F Below 59.4%

Please note that I reserve the right to adjust the grading scale based on the level of performance in the class on assignments and exams. Any such adjustments will be announced in class.

Problem Sets

Throughout the semester I will assign problems for you to complete and submit for a grade. These problems are intended to provide practical experience in working with econometric models, as well as to practice for the exams and aid in learning the techniques to complete your project. Completing the problems will occasionally involve the use of computer programs. You may work with other students in the class to complete the assignments, but each student needs to turn in their own assignment, written in his or her own words. We will likely have around 4-5 assignments during the semester, and I will drop the lowest score when calculating your final grade. Late assignments are accepted with a penalty of 10% per day, until the time the answer key is posted to Canvas. Once the answer key has been posted, submissions will no longer be accepted.

Econometric Project

Student progress in learning econometric methods will be demonstrated by the completion of an *original* course project. This will culminate in the writing of a 10 to 15-page term paper involving the use of the multiple linear regression technique. In order to accomplish this, you will construct a dataset on a topic of interest to you. In this paper you will describe your approach, effectively present statistical information, discuss your results, and then defend your use of the model(s) you have chosen. You should also be able to accurately discuss the limitations of your analysis, how much practical information has been gained, and how the project could be built upon moving forward. The first formal step in this project will be for you to turn in a project proposal describing the topic for your paper. The deadline for this proposal is October 20th. We will discuss the project in greater detail throughout the semester.

Exams

Exams will consist of a combination of multiple-choice/numeric answer and (primarily) short-answer free-response questions and problems. These exams will be completed through Canvas and are to be completed by each student independently. The first exam will take place during midterm exam week and the second during the week before "no exam week".

In-Class Assignments and Participation

As mentioned above, I believe your active participation in practicing the econometric techniques we discuss is vital to your understanding. I will not take attendance each day, but we will have several assignments that we work on in class to gain experience with the methods as we learn them. These assignments are typically (though not always) graded primarily on your participation and effort.

Tentative Course Outline (subject to adjustment)

**Week 1 (August 22 and 24):** Introduction and course themes, discussion of course project, review of regression basics.

**Week 2 (August 29 and 31):** Review of regression analysis basics: concepts, interpretations, predictions, residuals, statistical inference.

**Week 3 (September 5 and 7):** Modeling in regression analysis: quadratic terms, logarithmic transformations, qualitative information, and dummy variables.

**Weeks 4 and 5 (September 12, 14, 19, and 21):** Validity in regression analysis. Assumptions of OLS regressions, heteroskedasticity, multicollinearity, omitted variable bias

**Weeks 6 and 7 (September 26, 28, October 3, 5):** Testing equality and joint significance of coefficients, standardizing coefficients, interactions terms in regression analysis.

**Week 8 (October 10 and 12):** Discussion of project, summary of modeling/testing in regression analysis, review for exam,

**Exam 1 (October 12th).**

**Weeks 9 and 10 (October 17, 19, 24, 26):** Models with limited dependent variables: logit/probit, linear probability models, ordered logit, Poisson regression. Marginal effects and choosing between modeling options.

**Project Proposal – due Friday October 20th**

**Weeks 11 and 12 (October 31, November 2, 7, and 9):** Applied econometric techniques: production functions, difference-in-difference, instrumental variables, regression discontinuity.

**Week 13 (November 14 and 16):** Time-series econometrics: modeling options, diagnosing and correcting for serial correlation

**Project Dataset – due Friday November 17th**

**Fall Break: November 21 and 23**

**Week 14 (November 28 and 30):** Continued discussion of time-series modeling, introduction to panel data, review for exam.

**Exam 2 (November 30th)**

**Week 15 (December 5, 7):** Discussion of projects, Modeling options with panel data.

**Final Projects – due Thursday December 14th**


Additional Notes

The University of Idaho is committed to ensuring an accessible learning environment where course or instructional content are usable by all students and faculty. If you believe that you require disability-related academic adjustments for this class (including pregnancy-related disabilities), please contact the Center for Disability Access and Resources (CDAR) to discuss eligibility. A current accommodation letter from CDAR is required before any modifications, above and beyond what is otherwise available for all other students in this class, will be provided. Please be advised that disability-related academic adjustments are not retroactive. CDAR is located at the Bruce Pitman Building, Suite 127. Phone is 208-885-6307 and email is cdar@uidaho.edu. For a listing of services and current business hours visit uidaho.edu/cdar.

Please adhere to the UI policy on academic dishonesty, as emphasized by the UI value statement on academic integrity for students: "*The University of Idaho expects students to engage in academic activities with high standards of honesty and integrity. Honesty is a fundamental value of learning and the educational process. The University promotes activities that instill high standards of academic integrity, civility, and citizenship."* Academic dishonesty on an assignment or project will result in a score of 0 on the assignment, and a report of disclosure to the Dean of Students' office.

In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (208-885--6757), the U of I Counseling & Testing Center's confidential services (208-885-6716), the U of I Office of Equity and Diversity (208-885-2468), or the Office of Civil Rights and Investigations (208-885-4285).

The University of Idaho bans firearms from its property with only limited exceptions. One exception applies to persons who hold a valid Idaho enhanced concealed carry license, provided those firearms remain concealed at all times. If an enhanced concealed carry license holder's firearm is displayed, other than in necessary self-defense, it is a violation of University policy. Please contact local law enforcement (call 911) to report firearms on University property.

he Vandal Food Pantry is a free resource stocked weekly with food, grocery bags, and various hygiene items. Its eight locations across campus are accessible during building hours and open to all. Please take what you need.

**Healthy Vandals Policies**
Please visit the University of Idaho COVID-19 webpage often for the most up-to-date information about the U of I's response to Covid-19.