ECON 345-001: Introduction to Econometrics

Brigitta Jones

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E-mail: `bjones65@gmu.edu`
Class Hours: TR 12:00-1:15pm
Class Room: Planetary Hall 127
Office Hours: T 10:30-11:30am and W 2:00-3:00pm or by appointment
Office: Buchanan Hall D150

Course Description

This course is designed to help you use modern statistical tools to analyze economic relationships. The objectives of this course are to build a solid, theoretical framework for econometric analysis, to perform critical analysis of policy and program initiatives, and apply these techniques to your own individual research programs. The objectives of this course are to give you the ability to understand the empirical analyses performed by social scientists and the skills to do your own empirical analysis.

By the end of the course you should be able to:
1. Describe the difference between correlation and causation.
2. Interpret statistical information whether that be in academic research or in the news.
3. Use statistical software (e.g., Stata) to analyze data.
4. Perform basic data analysis on your own.
5. Evaluate the data analysis of others.
6. Create outputs such as regression tables or data visualization based on your data analysis.

Prerequisites

Intermediate Micro and Macro: ECON 306 and ECON 311
Statistics Courses: STAT 250 and STAT 350, *or* STAT 344 and STAT 354, *or* BUS 210 and BUS 310

Textbook

Introductory Econometrics: A Modern Approach, 7e by (7th Ed.) by J.M. Wooldridge

You may use an earlier edition as the material covered will be mostly the same. Also there may be additional readings assigned throughout the semester and those will be posted on Canvas.

Software Requirement

You will also be required to use Stata for assignments. There are three options for gaining access to Stata.

- The Fenwick Library has the Digital Scholarship Lab open Mon-Fri noon to 4 pm with other hours as specified at https://dsc.gmu.edu. The lab is found on the second floor of the library.

- You can access Stata virtually on the Virtual Computing Lab (VCL).

- A six month license is available for $48 and is sufficient for this course. Otherwise, the perpetual Stata license is a great investment if you plan to continue using econometrics in your academic career.

Course Structure

Lecture

As outlined on the schedule, most days I will lecture on a given topic. Before these lectures it is expected you read the chapters in the textbook that are listed for that day as the "preclass reading" on the calendar.

Throughout the lecture we will be working through problems to practice the concepts. You are expected to come to lecture prepared and ready to actively participate.

Problem Sets

As listed on the calendar, every three to four weeks there will be a problem set due. It will include problems to work through in Stata. This will allow you to work through the material as we cover it in class and receive feedback. You will have the class period to work through the problem set in class, these are the listed "Problem Set Workdays" on the calendar. This will give you the opportunity to work with your classmates and receive help from me directly. There are 4 total problem sets throughout the semester and each will be due on a Thursday by midnight on Canvas.

Assessments

On Tuesday October 8th you will have your midterm exam covering everything we've learned so far in the course.

On Thursday December 12th you will have your final exam covering everything we've learned in the course, i.e., it is cumulative and includes material that was covered on the midterm. It will be in the same classroom that we normally meet and it will be from 10:30am-1:15pm.

note: All quizzes and exams are closed note, closed book. You may use 4 function or scientific calculators.

Research Project

By the end of the course you will complete a research project. Your project will include all the components of a economic research paper that relies on econometrics. You will present your project in the form of a short oral presentation the last week of class.

I will be available throughout the semester to help you at every step of your project. Additionally, the day before Thanksgiving (a week before presentations) will be devoted to finishing off your projects.

This project will allow you to apply what we've learned in this course to better understand the world around us. You will pose a research question, construct an econometric model that can help you answer the question, discuss some related literature, find data, get results and explain your findings.

Late Work

Problem sets submitted after the deadline but before the answer key is posted to Canvas on Sunday at 5p will be accepted with 20% late penalty. No problem set will be accepted after solutions are posted.

There will be no make-up exams unless you have previously discussed this with me. If a student must miss an exam, this should be discussed with me prior to the exam. In the event of an emergency, students should email me immediately.

Grading Policy

Your grade will be made up by the following:

20% Midterm Exam
30% Final Exam
30% Problem Sets
20% Project Presentations

The grading scale will be:

A+ (100-98) A (97-93) A- (92-90)
B+ (89-87) B (86-83) B- (82-80)
C+ (79-77) C (76-73) C- (72-70)
D (69-60)
F (59-0)

Course Policies

Academic Integrity and Honesty

The George Mason University Honor Code is as follows:

To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University Community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set for this Honor Code: Student Members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.

I expect each of you to abide by this code. Any student suspected of any violation will be reported to the Office of Academic Integrity. See https://oai.gmu.edu/full-honor-code-document.

Generative-AI

Any student use of Generative-AI tools should follow the fundamental principles of the Honor Code.

Recording

For the privacy and comfort of your fellow students, audio and video recordings, as well as photography, is strictly prohibited during class.

Accommodations for Disabilities

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474

Tentative Schedule:

TUESDAY	THURSDAY
Aug 27th *Welcome to Econometrics*	29th *The Simple Regression Model* preclass reading: 2.1-2.2
Sep 3rd *OLS on Sample Data* preclass reading: ch 2.3-2.4	5th *Unbiasedness and Variance* preclass reading: 2.5
10th *Other Simple Regression Models* preclass reading: 2.6-2.7	12th Problem Set 1 Workday **PS1 due 11:59pm**
17th *Intro to Multiple Regression Analysis* preclass reading: 3.1-3.2c	19th *More on Multiple Regression* preclass reading: 3.2d-i
24th *Expected Value of the OLS Estimators* preclass reading: 3.3	26th *Variance of OLS Estimators* preclass reading: 3.4-3.6
Oct 1st *Applying Multiple Regression* preclass reading: 3.7	3rd Problem Set 2 Workday **PS2 due 11:59pm**

Tuesday	Thursday
8th **Midterm**	10th *T-tests* preclass reading: 4.1-4.4
15th *F-tests* preclass reading: 4.5-4.7	17th *Functional Form* preclass reading: 6.1-6.2
22nd *Goodness of Fit* preclass reading: 6.3-6.4	24th *Dummy Variables* preclass reading: ch 7
29th *Heteroskedasticity* preclass reading: ch 8	31st Problem Set 3 Workday **PS3 due 11:59pm**
Nov 5th Election Day **NO CLASS**	7th *Proxy Variables* preclass reading: ch 9
12th *Time Series* preclass reading: ch 10	14th *Difference-in-Differences* preclass reading: ch 13
19th *Instrumental Variables* preclass reading: ch 15	21st Problem Set 4 Workday **PS4 due 11:59pm**

Tuesday	Thursday
26th Research Project Workday	28th Thanksgiving **NO CLASS**
Dec 3rd Project Presentations Day 1	5th Project Presentations Day 2
10th Reading Day **NO CLASS**	12th **Final Exam 10:30am-1:15pm**