

ECON644 - Empirical Analysis II
Spring 2022
University of Maryland
Master of Sciences Program in Applied Economics

Instructor: Thomas Hegland
Class Schedule: Th 6:30pm - 9:15pm, KEY 0123
Office: Morrill 1102C (Thursdays Only)
Office Hours: By appointment; please reach out!
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Course Description

This course provides a first introduction to linear regression and closely related topics, with a focus on empirical applications and analysis in Stata. The principal learning objectives of this course are to enable students to apply basic econometric methods as well as interpret and critically analyze econometric results. Note: this is the second course in our program's 3-course Empirical Analysis sequence; completion of ECON643 is required for enrollment.

Our master's program has 7 core learning outcomes. The outcomes that this course contributes to are 1, 2, 3, 6, and 7 of the outcomes listed below:

1. Ability to understand, evaluate and analyze economic data.
2. Ability to understand and interpret statistical evidence from economic data.
3. Ability to apply empirical evidence to assessing economic arguments.
4. Ability to apply macroeconomic theories to policy discussions.
5. Ability to apply microeconomic theories to policy discussions.
6. Ability to communicate economic ideas to a broader audience.
7. Ability to evaluate the effectiveness of policy programs using sound economic techniques.

Required Course Materials

Main Textbook: Stock, James S. and Mark W. Watson. Introductory Econometrics. 4th edition. Pearson Education.

Stata Text: Mitchell, Michael N. Data Management Using Stata: A Practical Handbook. 2nd edition. Stata Press.

Technology: A laptop computer with a copy of either Stata/SE or Stata/MP installed.

Class Expectations, Assignments, and Grading

You will be expected to come to class with a laptop computer that has a copy of Stata installed. Most classes will be split between a lecture period and an empirical application period. The empirical application phase will require the use of your laptop. Please refrain from using your laptop during the lecture phase of class, during which it will not be needed.

For most classes, you will have a reading assignment from Stock and Watson or Mitchell. Readings that begin with “Read:” are required for all students; those beginning with “Review:” are strongly recommended, but only required for students not already strongly familiar with the subject of the assigned material.

All graded assignments for this class are listed below:

Homework: There are 4 homework assignments, worth 7 points each. Each homework assignment must be submitted on ELMS prior to class on the day it is due. For each assignment, you should submit a .doc file answering homework questions and discussing results as well as a .do file containing your code and an associated log file. In most cases, the homework assignments will build off of in-class exercises. You may work on homework assignments with 1-2 other students, but each of you must turn in your own code and results file. Please note: I will subtract points if your code is poorly commented and difficult to understand.

Replication Paper Proposal: You must write a proposal for your final replication paper, worth 2 points total. More details on this proposal are provided later in the syllabus.

Midterm Exam: There will be one midterm exam, worth 20 points total. This exam will require your laptop. While you must work on this exam alone, you may use your textbooks, notes, and the built-in Stata help files.

Final Exam: Your final exam will be worth 30 points total. This exam will require your laptop. While you must work on this exam alone, you may use your textbooks, notes, and the built-in Stata help files.

Replication Paper: You will be expected to write a short paper replicating the results of a published paper, which will be worth 20 points total. More details on this paper are provided further down in the syllabus.

Course Grading Scale:

A+: 98-100, A: 93-97, A-: 90-92
B+: 80-89, B: 70-79, B-: 60-69
C+: 50-59, C: 40-49, C-: 30-39

D+: 20-29, D: 10-19, F: 0-9

Course Schedule

Jan 27. Course introduction. Review of Statistical Distributions, Hypothesis Testing. Intro to Stata: Basics and Code Hygiene.

Feb 3. Review of Various Approaches to Null Hypothesis Significance Testing. Intro to Stata: Basics and Simple Programming.

Assignments Due Before Class: Read Stock and Watson Ch. 2-3. Review Mitchell Chs. 4 and 5.

Feb 10. Introduction to Linear Regression. Intro to Stata: Exploratory Data Analysis and OLS.

Assignments Due Before Class: Read Stock and Watson Ch. 4. Review Mitchell Chs. 6 and 8.

Feb 17. Linear Regression with One Regressor: Understanding β , Standard Errors, and Hypothesis Testing. Related Topics in Stata.

Assignments Due Before Class: Read Stock and Watson Ch. 5. Homework 1.

Feb 24. Outside Speaker Presentation. Introduction to Linear Regression with Multiple Regressors. Related Stata Exercises.

Assignment Due Before Class: Read Mitchell Ch. 10.1 - 10.5, Ch. A.4. Replication Paper Proposal Due.

Mar 3. Linear Regression with Multiple Regressors: Joint Hypothesis Tests, and Nonlinear Regression Functions. Related Stata Exercises.

Assignment Due Before Class: Read Stock and Watson Ch. 6. Read Mitchell Ch. 10.6 - 10.11.

Mar 10. Linear Regression with Multiple Regressors Wrap-up + Standard Error Clustering. Related Stata Exercises.

Assignment Due Before Class: Read Stock and Watson Chs. 7 & 8. Review Mitchell Ch. 7.

Mar 17. Midterm Exam.

Assignment Due Before Class: Homework 2.

Mar 24. Spring Break.

Mar 31. Regression Assumptions and Validity: The Challenge of Omitted Variables Bias. Related Stata Exercises.

Assignment Due Before Class: Read Stock and Watson Ch. 9.

Apr 7. Regression Assumptions and Validity Continued: Bad Controls and Other Matters. Related Stata Exercises.

Assignment Due Before Class: Read Stock and Watson Ch. 13.

Apr 14. Outside Speaker Presentation. The Garden of Forking Paths and Robustness. Positive Predictive Value. Related Stata Exercises.

Assignment Due Before Class: Read Mitchell Ch. A.5 and review the rest of Mitchell Ch. A.

Apr 21. Instrumental Variables and 2SLS. Related Stata Exercises.

Assignment Due Before Class: Homework 3. Read Stock and Watson Ch. 12.

Apr 28. Changing the Yardstick: Regression with a Binary Dependent Variable. Related Stata Exercises. Replication Paper Workshop.

Assignment Due Before Class: Read Stock and Watson Ch. 11. Come prepared to talk a fellow student through your replication paper project and your tests of the target paper's validity.

May 5. Changing the Yardstick: LASSO and the Problem of Prediction. Related Stata Exercises. Final Exam Question Session.

Assignment Due Before Class: Read Stock and Watson Ch. 14. Homework 4. Come prepared with questions you may have for the final exam.

May 12. Final Exam. Replication Paper Due on ELMS prior to the exam.

Replication Paper Assignment Details

Your replication paper assignment is worth 20 points in total. For your replication paper, you will be required to select one published paper in the economics literature that uses (or can be replicated using) publicly available data. You must then identify one key table of regression results in that paper which presents the paper's main findings. Your task will be to go either to the paper's replication data archive or directly to the public data source, obtain a copy of the data they use, set up and clean that data, and then produce your own version of that key table which mimics it as closely as possible. Additionally, you should present an exploratory data analysis of the most important variables in the paper, featuring both summary statistics and varying sorts of graphs. Finally, you should produce some alternative versions of the main table which test whether or not the original results

are robust to seemingly innocuous changes to the data setup or regression specification. Your paper should include an introduction, summary of the original paper, discussion of your findings, and a conclusion. You must also include a clean, readable, well-constructed code file that replicates your work, along with a log file showing what results when you execute your code. You must complete all of the above using code that you, yourself have written – you may not just rely on code made available by the original paper’s authors and may not submit code written by anyone else.

Your replication paper should be structured as follows:

- Title Page with Abstract
- Introduction: summarize the original paper’s core research question, data source, primary analysis, and main findings. Summarize your approach to replicating the paper’s main results and the findings from your replication efforts.
- Data: discuss the data you use to replicate the paper, the main variables you use, and any data cleaning efforts you make. Highlight any differences between your approach to cleaning and setting up the data versus that of the original authors.
- Exploratory Data Analysis: an exploratory data analysis of the most important variables in your replication, including summary statistics and graphical results.
- Empirical Analysis: introduce and interpret the original table you are replicating, present your table closely replicating the original, and then present your additional tables testing the robustness of the original results. Discuss and interpret your findings, drawing implications for the original results.
- Conclusion
- References: the paper being replicated plus any other articles you cite.

The replication paper is worth 20 points. These points will be allocated across the different sections of the paper as follows:

- Abstract, Introduction, and Conclusion - 3 points
- Data Section - 3 points
- Exploratory Data Analysis - 4 points
- Empirical Analysis - 5 points
- Code and Log File Readability, References - 5 points

Replication Paper Proposal Assignment Details

In addition to the final replication paper, you must submit a paper proposal, worth 2 points. This proposal should be brief and must include:

- The citation for the paper you intend to replicate.
- A short (≤ 1 paragraph) summary of the paper in your own words.
- A copy-pasted version of the key table you intend to replicate.
- The name of the dataset you will use to replicate the above table.
- Basic summary statistics of the main outcome and explanatory variables from the key table that you have produced using your copy of the dataset.

In order to find papers for replication, I encourage looking through any of the American Economic Association journals (especially older editions), the Quarterly Journal of Economics, the Review of Economics and Statistics, and the Journal of Labor Economics. Alternatively, you may start by looking for datasets using the public IPUMS versions of major datasets, such as the ACS, the CPS, the MEPS, or the ATUS. You can find papers using these datasets by searching bibliography.ipums.org under the USA, CPS, MEPS, and ATUS “Data Collections”. Many authors also host replication archives on their website, where you can obtain copies of the data they use for their project.

Course Policies

Laptop Policy

The usage of laptops, tablets, and other electronic devices (other than recording devices) is discouraged outside of the empirical application portions of the class. For explanation, please see “The Pen Is Mightier Than The Keyboard” (Mueller and Oppenheimer, *Psychological Science*, Vol 15, Issue 6).

Standard Policies

Work Load

Mastering the material covered in this course requires a significant amount of work outside of class. Students should expect to spend more time outside of class than in class – typically at least twice as much time.

Academic Progress

The graduate school requires that students maintain a GPA of at least 3.0. Students whose cumulative GPA falls below 3.0 will be placed on academic probation by the graduate school. Students on academic probation must ask the program’s director to petition the graduate school if they want to remain in the program. The petition must include a plan for getting the student’s GPA up to at least 3.0. Students who do not live up to their plan can be forced to leave the program without having earned the degree. Note: a grade of “B” corresponds to a GPA of 3.0. A grade of “B-” corresponds to a GPA of 2.7.

Excused Absences

If you miss any class meetings for any reason, you are still responsible for all material covered during the meeting you missed. It is your responsibility to work with the instructor to make sure you catch up on the missed material. Instructors routinely facilitate things by posting lecture notes, etc.

If you need to miss an exam or other graded course requirement because of illness, injury, or some other emergency: Follow doctor's orders and get documentation. Get in touch with the instructor as soon as you're able – preferably prior to missing the exam or deadline. Communicate with the instructor to make up the course requirement as soon as possible. You are entitled to recover before you make up the course requirement, but you are not entitled to extra days to study beyond the time the doctor's note says you're incapacitated. If you are incapacitated for more than a week or so beyond the end of the term, your grade in the course will be an "Incomplete". In such cases you must negotiate a plan with your instructor for completing the course requirements. Once you make up the course requirement the instructor will change your "I" to the appropriate letter grade.

School Closings and Delays

Information regarding official University closing and delays can be found on the campus website and the snow phone line: (301) 405-SNOW (405-7669) The program director will also announce cancellation information to the program as an announcement on the program's ELMS/Canvas site. This will generally be done by 1:00 p.m. on days when weather or other factors are an issue. If classes need to be canceled during the semester, it may be necessary to move the final exam back a week so missed classes can be made up.

UMD Counseling Center

Sometimes students experience academic, personal and/or emotional distress. The UMD Counseling Center in Shoemaker Hall provides comprehensive and confidential support services that promote personal, social, and academic success. The cost of these services is covered by the fees you already paid when you registered for classes, and there is no additional charge if you use the services. Proactively explore the range of services available, including the Counseling Service, Accessibility and Disability Service, and the Testing Office, all described at <http://www.counseling.umd.edu/>

Graduate Academic Counselor

The UMD Graduate School also has an academic counselor available to support students who are having difficulty navigating mental health resources on campus, are considering a leave of absence and/or need assistance finding mental health care off campus. The Graduate Academic Counselor also facilitates bi-weekly Graduate Student Circle Sessions which provide an opportunity to learn about resources and connect with other graduate students. Students can learn more about the Graduate Academic Counselor by going to: <https://gradschool.umd.edu/gradcounselor>

Course Evaluations

Near the end of the term, you will receive an email inviting you to submit a voluntary and anonymous course evaluation. Your feedback on courses will be very helpful in improving the quality of instruction in our program.

Access to Morrill Hall and Morrill 1102

Morrill Hall is locked every day from 7:00 p.m. - 7:00 a.m. Your university ID gives you swipe access to the back door of the building. There is keypad access to the door of Morrill 1102. The code will be shared with students by the program coordinator.