Empirical Analysis I: Foundations of Empirical Research

Syllabus

Instructor: Ye Zhang
Email: zhangye@umd.edu
Office Hours: Thursdays 5:30PM-6:15PM, or by email appointment

Teaching Assistant: Mengyi Zhong
Email: myzhong6@umd.edu
Office Hours: Mengyi is supporting two sections of ECON643, our section and the PR01 section. She is hosting weekly 45-minute office hours for each section as follows. You are welcome to attend either of the weekly office hours although you are strongly encouraged to participate in the session that was intended for our own section of the course.

Sundays, 4:00PM-4:45PM (For our section PR02)
Mondays, 5:15PM-6:00PM (Primarily for section PR01)

Lectures and Sections

Each week there will be two synchronous online class meetings of 60 minutes each on Wednesday, from 6:45pm to 7:45pm and then from 8:00pm to 9:00pm. There will also be asynchronous class content each week such as student presentations and online discussions.

Course Description

This is the first course in the three-course sequence “Empirical Analysis”: ECON 643, ECON 644, and ECON 645, it provides students with a foundation for methods and applications used to conduct empirical research in economics. Main topics include probability theory, estimation and statistical inference, and an introduction to linear regression analysis. This course also introduces students to perform basic statistical analysis using STATA software.

This course requires a substantial amount of work outside the class. You are encouraged to form study groups and practice explaining concepts to each other. To succeed in this course, however, you will need to do the bulk of the work individually. You are expected to preview the material before each class, participate in online discussions and in lectures, review the material after class, and complete the assignments on time.

Our program has 7 general learning objectives:

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

The learning outcomes that pertain to this course are: 1, 2, 3, 5, 6, and 7.

**Textbooks and Software**

The main required textbooks and software for the course are:


3) STATA software, the last page of the syllabus provides detailed information on how to obtain STATA software.

**Grading**

Problem Set: 20% (Best Four out of Five)
Midterm Exam: 20%
Final Exam: 30%
Presentation: 10%
Data Project: 15%
Online Discussion: 5%

Students’ grades on each component of the course will be weighed according to the scale above to calculate their numerical course grade. The numerical course grades will be translated into letter grades as follows:

93 – 100 ⇒ A | 90 – 92 ⇒ A-
89 – 80 ⇒ B+ | 70 – 79 ⇒ B | 60 – 69 ⇒ B-
50 – 59 ⇒ C+ | 40 – 49 ⇒ C | 30 – 39 ⇒ C-
20 – 29 ⇒ D+ | 10 – 19 ⇒ D | 0 – 9 ⇒ F

The grade A+ is reserved for the top student or two in the course (or maybe no one) at the instructor’s discretion.
Problem Sets

The problem sets will consist of both theoretical and empirical questions. A typical problem set will ask you to solve theoretical problems, generate descriptive statistics, and discuss the results. Your grade for the empirical part of the problem sets will depend on both whether or not you in fact estimate what you are asked to estimate and get the correct answer, and on how well you interpret your results. Both are valuable (and marketable) skills. In my experience, interpretation is more difficult to learn. The theoretical part of the problem sets may require you to do some calculations, or to explain the meaning of various statistical formulae.

As described in detail on the first page of each problem set, you must turn in both your clean and commented STATA log file and a completely separate set of answers to the problem set questions. The answers should consist of complete English sentences, possibly in addition to mathematical derivations or formulae and tables of your own creation. Generally, your problem sets should be typed. However, derivations and descriptive graphs may be done by hand. If you do this, you should scan your handwritten work and copy and paste into your main Word document. In my experience, neater and better organized problem sets receive higher grades, conditional on content. You are welcome to work together on the problem sets, but each student must turn in his or her own version of the assignment in their own words.

Problem sets should be turned in on ELMS. As solutions of problem sets will be posted online after due date and you are allowed to drop your lowest problem set grade, no late problem sets will be accepted for any reason.

Data Projects

Each student needs to participate in a data project for this course to build your empirical skills of working with various datasets. In groups of three students, you all will spend some time getting to know a published applied paper, organize and summarize the data appropriately, and perform some analysis of the data. Instructions and more details on the data project will be posted on ELMS.

Presentations

Students will work in groups of three to prepare and give a 15-minute presentation on the research paper you choose for the data project. The presentations should focus on the main research question of the paper, review the relevant economics literature, describe the data used to study the research question, and present empirical evidence related to the research question. An example presentation will be available in ELMS.

Students are required to submit a first draft of the presentation to me via email no later than 5PM the Friday preceding their presentations. I will provide you with initial feedback which should be incorporated into your final presentation. Final drafts of the presentation are due by 5:30 PM before the class on Wednesday.
Online Discussions

We will have asynchronous discussions of questions related to the materials covered in class online. On approximately 9 out of the 12 lecture weeks, I will post one or a series of questions to start our discussion on relevant course material. You are expected to post at least one and no more than three contributions to the online discussion during those weeks. I will post questions by 11:59 PM on Thursdays. The discussion will be open until Sunday at 11:59 PM for you to comment and respond. I will check in twice a day to read what’s been posted, respond to some things, and redirect the discussion as necessary.
# Tentative Course Outline

The class will meet on 12 consecutive Wednesday nights between March 3rd and May 19th with one exception: No class on Wednesday March 17th (spring break), and one Monday class from 6:45 pm - 9:00 pm on March 22nd.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Readings</th>
<th>Assignments</th>
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<tr>
<td>1</td>
<td>3/3/2021</td>
<td>Introduction and Descriptive Statistics I</td>
<td>ASW Chapters 1 and 2</td>
<td>Data Project Teams</td>
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<td>2</td>
<td>3/10/2021</td>
<td>Descriptive Statistics II and Introduction to STATA</td>
<td>ASW Chapter 3; A Chapters 1, 2, 3, and 5</td>
<td>PS1 Out</td>
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<td>3</td>
<td>3/22/2021</td>
<td>Introduction to Probability and Working with STATA Do-files</td>
<td>ASW Chapter 4; M Chapter 4</td>
<td>PS1 Due; PS2 Out</td>
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<td>4</td>
<td>3/24/2021</td>
<td>Probability Distributions</td>
<td>ASW Chapters 5 and 6</td>
<td>PS2 Due; PS3 Out</td>
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<td>5</td>
<td>3/31/2021</td>
<td>Sampling Distribution and Interval Estimation</td>
<td>ASW Chapters 7 and 8</td>
<td>Student Presentations</td>
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<td>6</td>
<td>4/7/2021</td>
<td>Hypothesis Tests and STATA Examples</td>
<td>ASW Chapter 9; A Chapter 7</td>
<td>PS3 Due; Student Presentations</td>
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<td>7</td>
<td>4/14/2021</td>
<td>Inference I and STATA Examples</td>
<td>ASW Chapter 10; A Chapter 7</td>
<td>PS4 Out; Student Presentations</td>
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<td>8</td>
<td>4/21/2021</td>
<td>Midterm Exam (75 Minutes) and Inference II</td>
<td>ASW Chapters 11 and 12; A Chapter 9</td>
<td>PS4 Due; PS5 Out</td>
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<td>9</td>
<td>4/28/2021</td>
<td>Simple Linear Regression and STATA Examples</td>
<td>ASW Chapter 14; A Chapters 8 and 10</td>
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<td>10</td>
<td>5/5/2021</td>
<td>Omitted Variable Bias and Multiple Regression</td>
<td>ASW Chapter 15; A Chapter 10</td>
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<td>11</td>
<td>5/12/2021</td>
<td>Experimental Design and Final Exam Review</td>
<td>ASW Chapter 13</td>
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<td>12</td>
<td>5/19/2021</td>
<td>Final Exam (120 Minutes)</td>
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<td>5/20/2021</td>
<td>Data Project Report Due</td>
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University of Maryland Policies

Course Website: Copies of the course syllabus, your grades, and other relevant links and documents will be posted on the course’s ELMS/Canvas website. You can access the site via www.elms.umd.edu. You will need to use your University of Maryland “directory ID” and password.

Email: The University has adopted email as the primary means of communication outside the classroom, and I will use it to inform you of important announcements. Students are responsible for updating their current email address via http://www.registrar.umd.edu/current/ (Under the first major heading of “Online Transactions” there is a link to “Update Contact Information”).

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 Integrity: The University of Maryland has a nationally recognized Code of Academic Integrity. You should inform yourself about the UMD policies related to academic misconduct:

https://www.studentconduct.umd.edu/home/current-students

Cases of academic misconduct, including plagiarism and giving or receiving unauthorized assistance on exams, will be referred to the UMD Office of Student Conduct. If found responsible for academic misconduct, students can be subject to sanctions. The standard sanction for graduate students found responsible for cheating on exams is expulsion from the university.

Student Conduct: Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to show civility to one another or myself will be referred to the Office of Student Conduct. You are expected to adhere to the Code of Student Conduct.

Excused Absences: The University of Maryland’s policy on excused absences is posted here:

http://www.president.umd.edu/administration/policies/section-v-student-affairs/v-100g

Please note:

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 – not the instructor’s – to get yourself caught up in the course. 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 1:00PM on days when weather or
other factors are an issue. If classes need to be cancelled 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 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, Learning Assistance Service, and the Testing Office,
all described at http://www.counseling.umd.edu/.

Students with Disabilities: The University of Maryland does not discriminate based on differ-
ences in age, race, ethnicity, sex, religion, disability, sexual orientation, class, political affiliation,
or national origin. Reasonable accommodations will be arranged for students with documented
disabilities. Students who have an accommodations letter from the Accessibility and Disability
Service (ADS) should meet with me during the first week of the semester to discuss and plan for the
implementation of your accommodations. If you require reasonable accommodations but have not
yet registered with ADS, please contact the Accessibility and Disability Service at 301-314-7682
or adsfrontdesk@umd.edu.

Academic Progress: The UMD 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 enrolled 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 have their enrollment in the program terminated 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.

Laptop Computer Requirement: Completing some of this course’s requirements will require
a laptop computer (not a notebook or a tablet!) with at least 1 GB of RAM and at least 5 GB
of free space available on the hard-drive. We recommend laptops with a 15-inch screen. Screens
smaller than 13 inches are probably not practical.

STATA Purchasing Options: Students in our program must purchase STATA. STATA offers
different “flavors” and different lengths of licensing. Price varies according to these two factors.
We do not recommend Small STATA since it is too limited for the coursework in our program. STATA/IC is the least expensive and sufficient version for your coursework. With a single-user license, you can install STATA on up to three computers. Description of all the flavors are given here:

http://www.stata.com/products/which-stata-is-right-for-me/

The most cost-effective license duration is to purchase a perpetual license (which never expires). The student price for a perpetual STATA/IC license is $225. The student price for an annual license is $94, so more expensive if you end up using STATA for longer than 1 year – which you will do just to graduate from our program. Most of our graduates continue to use STATA even after they graduate, so the $225 perpetual license is worthwhile. Perpetual license holders are also entitled to discounted STATA upgrades in the future. Here is the link for student single-user purchase:

https://www.stata.com/order/new/edu/gradplans/student-pricing/

During the checkout process you will be asked to verify your student status. I believe this can be done by uploading a copy of your student ID, your tuition bill or statement, or verifying your “@umd.edu” email address.