Dartmouth College
Department of Economics

Prof. Steve Mello
Spring 2021

ECONOMICS 20: ECONOMETRICS
Syllabus

Professor: Steve Mello
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Class time: TuTh 10:20-12:10 ET / TuTh 2:50-4:40 ET

Office hours: W 12:30-2:30, or by appointment.

Zoom info: Posted on Canvas

Final Exam: TBA

Overview
This course covers the statistical techniques that economists use for estimating, testing, and forecasting economic relationships. The emphasis is on understanding the techniques involved and also on what they mean in terms of the economic problems being studied. Successful completion of this course should allow you to (1) read much of the professional empirical literature in economics and (2) be prepared to start doing independent research using economic data, particularly in a 40-level class. Research projects at the end of the course are part of the latter preparation.

Statistical Software
There will be significant emphasis on the use of statistical software STATA. This software is free to students and can be downloaded from the following site:

(PC) https://services.dartmouth.edu/TDClient/KB/ArticleDet?ID=64632
(Mac) https://services.dartmouth.edu/TDClient/KB/ArticleDet?ID=64644

Please install STATA 15 and follow instructions for off-campus STATA use if you are off campus. You first need to install the key access software and, if you are off campus, enable certain options. This software will be used through the class in STATA lab segments.

Additional help in getting STATA installed is available at the computing center, and additional help with using STATA can be obtained from myself, the course teaching assistant, or from Dartmouth's social science statistical consultant, Jianjun Hua. His office is in Baker-Berry Library 178A and he is available by appointment (requires advance email).

Prerequisites

This course assumes that you have a good grasp on the concepts covered on Economics 1, 10 and Match 3. For example, you should be familiar with the material in in Appendices A, B, C (excluding the section on "maximum likelihood") in Wooldridge, *Introductory Econometrics*. If you are not comfortable with this material, you should make time out of class to review this material. It will be extremely difficult to pass this course without knowledge of this material. This first problem set is largely based on this material with no supporting lectures.

Readings

We will mostly focus on lecture notes. The materials covered in lecture and any provided handouts is what you are responsible for. There is one assigned textbook for the course:

(AP) Joshua Angrist and Jorn-Stephen Pischke, *Mastering Metrics: The Path from Cause to Effect*

This is a very useful book that provides a digestible and intuitive treatment of many of our key concepts. However, the book alone does not provide a sufficiently deep treatment of some of the more technical components of the course. In the past, ECON20 has typically also used Wooldridge, *Introductory Econometrics*. I am not requiring this textbook for our course, but you are, of course, welcome to find a copy and read it on your own.

There will occasionally be other readings, such as an economics research paper or handout covering a specific topic. Note that if I am providing a handout on a given topic, that means that I will not be covering that topic during lecture, but you are expected to know the handout material.

Class Meetings

The current plan is for class meetings to follow this structure:
60-minute lecture; 5-minute break; 45-minute activity

In the first hour, we will cover key concepts in a lecture format. Participation is still encouraged during the lecture part of class. After lecture, we will take a 5-minute break. The final 45-minutes will be devoted to active-learning activities. Activity portions of class will usually involve working in small groups and will often be devoted to "coding up" the material covered during lecture. We may need to depart from this planned structure as necessary if it is not working out.

Assignments

There will be three each of two types of homework assignments:

1. Conceptual Exercises (CE). These resemble standard problem sets. Please note that these will be your primary form of exam practice. I will provide no more than one practice exam for each of our three exams during this course.

2. Data Exercises (DE). These are exercises that require programming in STATA and applying the concepts from class to real-life data analysis. Data exercises will be started during class time on days where the activity portion of class is noted as "STATA lab." Each DE will have a short pre-lab assignment that is to be completed before the start of class on a STATA lab day.

Both types of assignments will be graded very lightly with an emphasis on completion (completed exercises will typically be given full credit). I recommend attempting the exercises to the best of your ability, however, as they will be your primary means of practicing for exams. Note that there is a near-zero tolerance policy for exercises turned in late.

There will also be a group project assignment (one project to be turned in per group). The final project will be due on the last day of class, but there will be several intermediate stages with due dates throughout the quarter, as noted on the class schedule. I will provide more details later.

Grading

The usual grade distribution for core economics class is a B-median, broken down as roughly 30 percent A's (A, A-), 30 percent B's (B+, B, B-), and 30 percent C's (C+, C, C-) or below. The final grade in this class will be determined as follows:

Midterm #1	20%
Midterm #2	20%
Final Exam	20%
Conceptual Exercises (3)	10%
Data Exercises (3)	10%
Group Project	15%
Participation	5%
Total	100%

The two midterm exams will be timed exams administered through Canvas and due by the end of the day on April 20 and May 13. The cumulative final exam will most likely be a take-home style exam, but I will provide more details on the final exam as we near the end of the quarter.

Economics Department Exam Policies

Midterm exams (written quizzes in our case) and final exams must be taken at the scheduled times. Final exams are scheduled well in advance of the beginning of the term and all midterm exam dates are on the syllabus. If your travel plans at the end of the term conflict with the scheduled final exam you should not take this class this term.

- Exceptions may be made for Dartmouth-sponsored events such as varsity sports and other activities related to your Dartmouth education.
- On rare occasions, there may be a conflict with the final exam in another class. If possible, these conflicts will be resolved by taking the final exam for one of those classes during a different final exam period on the same day.
- Acute events, such as an illness or a death in the family will be handled on a case-by-case basis.

In all cases, please inform me as soon as you are aware of any potential conflict.

Honor Code

All students in the class are expected to abide by Dartmouth's Academic Honor Principle (our honor code) described here: https://students.dartmouth.edu/judicial-affairs/. While you are encouraged to work together on many assignments, please turn in your own work. Do not give, seek, or receive

help during exams or quizzes. Please also try to avoid behaviors that might give the impression of collaborating exams and quizzes. Suspected violations of the Academic Honor Principle will be referred to the Office of Judicial Affairs for investigation.

Students with Disabilities
Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to see me privately as early in the term as possible. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office (Carson Hall, Suite 125, 646-9900). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to their professor. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

- Any extra time for exams will be contiguous with the scheduled exam time if at all possible. Generally, students will start the exam early and finish with the rest of the class or start with the rest of the class and finish late.
- In the week before each exam it is your responsibility to verify all arrangements by email. It is your responsibility to make sure that the time and place for your exam is clear before the day of the exam for each exam during the term.

Religious Observances
Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss appropriate accommodations.

Names and Pronouns
In this classroom, we will respect and refer to people using the names and personal pronouns that they share. If you think I may use incorrect pronouns for you or if I have used incorrect pronouns for you, please email me and I will do my best to use the pronouns you identify with.

Wellness Resources
I recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including:

- Your undergraduate dean (http://www.dartmouth.edu/~upperde/),
- Counseling and Human Development (http://www.dartmouth.edu/~chd/), and
- Student Wellness Center (http://www.dartmouth.edu/~healthed/).

I encourage you to use these resources.

Please Be Respectful
This class mainly involves working in groups. Please be respective, inclusive, and considerate in and out of class. Please make an effort to understand one another's perspectives. This will make everyone's experience in the group more pleasant, and it is also likely to make the group more effective. Please also try to be understanding of the challenges your fellow students are facing.

Course Outline

This course outline is preliminary and subject to change, I will make regular updates to the course outline on Canvas as needed.

Class	***Reading***	***Lecture***	***Activity***	***Due***
01. 03/30		Introduction	Intro to Data	Course Survey Due 3/29
02. 04/01	AP Ch1	Rubin Model; Experiments	Problems	
03. 04/06	AP Ch2	Bivariate Regression; ANOVA	STATA Intro	Stata Installation
04. 04/08		Multiple Regression; OVB	Problems	CE1
05. 04/13		Sample Variation; Inference	STATA Lab	DE1 Pre-Lab
06. 04/15	Handout	Heteroskedasticity, Asymptotics	OH: Exam Review	DE1 Due 04/16
07. 04/20		Midterm #1		
08. 04/22	AP Ch3	Instrumental Variables	Discussion	
09. 04/27	Handout	Instrumental Variables	STATA Exercise	
10. 04/29		Panel Data	Problems	CE2
11. 05/04		Panel Data	STATA Lab	DE2 Pre-Lab
12. 05/06	AP Ch5	Difference-in-Differences	Discussion	DE2 Due 05/07
13. 05/11		Difference-in-Differences	STATA Exercise	CE3; Project 1
14. 05/13		Midterm #2		
15. 05/18	AP Ch4	Regression Discontinuity	Stata Lab	DE3 Pre-Lab; Project 2
16. 05/20		OH: DE3 Help		
17. 05/25		OH: Project Help		DE3; Project 3
18. 05/27		OH: Project Help		
19. 06/01		OH: Exam Review		Project Final