ECONOMICS 20: ECONOMETRICS
SYLLABUS

CONTACT
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Office Hours:
Mon/Tue 3:00-4:15
304 Rocky

FINAL EXAM:
The final exam will take place on Tuesday, 20 November at 11:30 am.

OVERVIEW:
This course intends to expose you to 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 problem 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. A group project is part of the latter preparation.

There will be significant emphasis on the use of the statistical software STATA. This software is free to students and can be downloaded from the site (please download STATA 12):

(PCs) http://www.dartmouth.edu/comp/soft-comp/software/downloads/windows/stata.html

Mac Users will also need the key access software (also available on that page, if you don’t have it already), and PC users will need to input the license information in the text file bundled with the download. This software will be introduced in a special STATA tutorial class

When: Wednesday, September 19
Where: Star Instructional Center 274 (Library second floor, in “Jones Media Center”)

PREREQUISITES
This course assumes that you have a good grasp of the concepts covered in Economics 1, 10 and Math 3. For example, you should be familiar with the material in Appendices A, B, C (excluding “maximum likelihood”) in the Wooldridge text. If you are not comfortable with this material, you should make time out of class to review this material. It is extremely unlikely that you will pass this course without knowledge of this material. The first problem set will largely be based on this material, without any supporting lectures.

COURSE MATERIALS
You will need several things for this class:
1. **Textbook.** We will mostly focus on online lecture notes – the material covered in lecture, including any handouts, is what you are responsible for. The textbook is for your reference and background, and may also provide some practice problems. The textbook is:


This textbook is available at the bookstore. I do not recommend older editions. Instead, if you are looking for a cheaper price, try the electronic version at www.cengagebrain.com.

2. **“Clicker.”** To do in-class practice multiple choice questions, we will use “clickers,” hand held remotes that allow me to take an instant poll of the class. All students will need what is technically called a “Response Card RF” (produced by Turning Technologies) available at computing sales and service. I think you can sell them back at the end of the term.

3. **Calculator.** You will need a calculator for all quizzes and tests. It need not be a very advanced calculator: it need only be able to handle arithmetic operations, square roots, and natural logs.

**COURSE REQUIREMENTS:**

1. There will be two quizzes, two in-class midterm exams, and a comprehensive final exam. Your lowest quiz performance will be dropped. All exams will be closed book and closed notes. Exams will cover materials from lectures.

2. There will be a project to be turned in. You will form groups of 3-5 people and each group will turn in one project. I will tell you more about the project as we go along.

3. In addition, I will provide some readings, papers from economics journals which apply the techniques we learn in class to some questions of economic and/or social importance. These readings are primarily for you to see some applications of the techniques you are learning. You will not be tested on the content or details of these suggested readings, only the concepts. Many of my exam questions are based on interpreting similar types of research findings, so reading and thinking about economics papers is good preparation for exams.

4. I will also hand out problem sets, which will serve as practice for the exams. For the problem sets, I encourage that you work in small groups, so you may learn from each other. Problem sets will be graded lightly: complete problem sets will usually be given full credit.

5. Your “class participation” grade is my assessment of your effort and level of engagement in and out of class. Well done problem sets will count towards this, for example, as will regular attendance. For example, I will note participation with “clickers” on in-class multiple choice questions, like when we go over the problem sets.
Exams and project may not be postponed except in the case of a **documented** emergency. Your total grade will be determined as follows:

- **Quiz** 6%
- **Mid-term I** 15%
- **Mid-term II** 15%
- **Final exam** 30%
- **Problem Sets (6)** 12%
- **Group Project** 12%
- **Class Participation** 10%
- **Total** 100%

All lecture notes, readings and assignments will be posted on Blackboard.

**Final Grade Distribution**
The final grade will be based on the departmental curve of a B median, broken down as roughly 30 percent “As” (A, A-) 40 percent “Bs” (B+, B, B-), and 30 percent “Cs” (C+, C, C-) or below. Grades below C may or may not be given; a grade below C indicates a performance significantly below others in the class and may indicate my serious concern about a student’s readiness to apply econometrics to independent research in a 40-level class. After each midterm, you will receive an assessment of your performance so far in the class.

**Excused Absences and Special Needs:**
If you have a learning, physical or psychiatric disability which may warrant disability-related classroom accommodations, please speak with me during the first week of classes. The Academic Skills Center in 301 Collis Center will be asked to verify that you are registered for these services. **Do not wait until just before (or after) the exam.**

The latter statement also applies to students who will be away during an exam for a legitimate reason, for example for athletes who will be away for a competition. **Please let me know right away if you cannot make one of the exams, you will not be accommodated at the last minute.** I also only reschedule exams only **before** the assigned date, and never after.

**Lecture Schedule and Readings:**
See separate Course Outline (attached). For personal reasons – well, OK, my wife and I are having a daughter this quarter (yeah!) – I will take a week off at some point this quarter, at which point the whole calendar will be shifted up by a week. As a result, for the first month of class we will have an X-hour every week. I’m sorry about that! However, you will also get a week off, which will most likely be around October 25th. The exact date, unfortunately, is not known, although I have asked her many times.

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1 Grades on individual items will be recorded in terms of “points,” with 1000 total points in the course, each worth 0.1%.
ECONOMICS 20: ECONOMETRICS

COURSE OUTLINE

The schedule below indicates the topic to be covered in each lecture. All the readings may not be covered in class if we run out of time but most of them will be. While we will cover the topics in the order shown, the exact dates may change as I may not be able to cover everything planned and/or postpone things to the following class. I have noted particular topics that may be skipped or postponed with a “*”.

Note that there are many “X-hours” – almost every week at the beginning of the term. This makes up for a week of class I will cancel after the delivery of my daughter (yeah!) at an unknown date later in the term, approximately October 25th. Therefore, the exact dates on this schedule are subject to change, and I will provide an updated course outline after I come back. The outline does reflect the order of classes, however, which is unlikely to change.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignments</th>
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</thead>
<tbody>
<tr>
<td>#1. 9/10 MON</td>
<td>Introduction</td>
<td>Cht 1 W;*, Cht 1 AP†, DiNardo‡</td>
<td>Problem Set 1 (PS1) “Statistics Review and Simple Regression” – Out – due: 9/17</td>
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<tr>
<td></td>
<td>What is causality? What is a well-posed question?</td>
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<tr>
<td>#2. 9/12 WED</td>
<td>Rubin Causal Model</td>
<td>Cht 2 AP</td>
<td></td>
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<tr>
<td></td>
<td>Simple regression</td>
<td>Cht 2 W</td>
<td></td>
</tr>
<tr>
<td>#3. 9/13 X-Hour</td>
<td>Simple regression</td>
<td>Cht 2 W</td>
<td></td>
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<tr>
<td>#4. 9/14 FRI</td>
<td>Multiple regression</td>
<td>Cht 3 W</td>
<td></td>
</tr>
<tr>
<td>#5. 9/17 MON</td>
<td>More Multiple Regression</td>
<td>Cht 3 W</td>
<td>PS1 Due; PS2 “Multiple Regression I” – Out – due 9/26</td>
</tr>
<tr>
<td>#6. 9/19 WED</td>
<td>STATA Intro</td>
<td>Cht 4 W</td>
<td></td>
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<tr>
<td>#7. 9/20 X-hour</td>
<td>Inference (t-tests)</td>
<td>Cht 4 W</td>
<td></td>
</tr>
<tr>
<td>#8. 9/21 FRI</td>
<td>Inference (F-tests)</td>
<td>Cht 6 W</td>
<td></td>
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<td>Changing Units of X and Y</td>
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- Part I: Linear Regression Estimation and Inference -

* "W" is our textbook by Jeff Wooldridge, Introductory Economics. Except for chapter 1, which you are responsible for, the chapters listed below are references rather than required reading.


#9. 9/24
MON
Dummy variables
Cht 7 W

#10. 9/26
WED
Generalized difference-in-differences
Section 13.2 W
PS 2 Due; PS3 “Multiple Regression II” – Out – due 10/8

#11. 9/27
X-Hour
Quiz: regression basics closed book & notes

#12. 9/28
FRI
Diff-in-Diff: Examples Dynarski N


#13. 10/1
MON
Review

#14. 10/3
WED
EXAM: Midterm I closed book & notes

#15. 10/5
FRI
Asymptotics Heteroskedasticity
Cht 5 W Cht 8 W

#16. 10/8
MON
Heterogeneous TE; sample selection; quantile regression
Cht 9 W PS 3 Due; PS 4 “Specification Issues/Panel Data” – Out – due 10/15

#17. 10/10
WED
Measurement Error Heteroskedasticity
Cht 9 W Cht 8 W Continuing coverage of heteroskedasticity if necessary

**Part II: Panel Data and Instrumental Variables**

#18. 10/11
X-Hour
Introduction to Panel Data Cht 13, 14 W

#19. 10/12
FRI
Panel Data Advanced Panel Data
Cht 13, 14 W

#20. 10/15
MON
Review PS 4 Due; PS5 “Panel Data and IV” – Out – due 11/2

#21. 10/17
WED
EXAM: Midterm II closed book & notes

#22. 10/19
FRI
Project tips Cht 19 W Project Assignment-Out Find Group of 3-5 by 10/24; topic by 10/29

#23. 10/22
MON
IV and 2SLS Cht 15 W ** FINAL DATE FOR COURSE WITHDRAWAL **

#24. 10/24
WED
IV and 2SLS Cht 15 W ** Professor Lewis departs approximately here for a week ** Dates may change

10/29
MON
Project Topic due – send by email

#25. 11/2
FRI
IV and 2SLS Cht 15 W PS5 Due; PS6 “Limited Dependent Variables” – Out – due 11/12
### Part III: Non-linear Models

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<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>#26. 11/5 MON</td>
<td>Limited dependent variables</td>
<td>Cht 17 W</td>
</tr>
<tr>
<td>#27. 11/7 WED</td>
<td>Optional Quiz: Panel Data and IV; closed book &amp; notes</td>
<td></td>
</tr>
<tr>
<td>#28. 11/9 FRI</td>
<td>Limited dependent variables</td>
<td>Cht 17 W DC**</td>
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### Part V: Review

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<tbody>
<tr>
<td>#29. 11/12 MON</td>
<td>Review</td>
<td>PS 6 Due</td>
</tr>
<tr>
<td>11/20 TUE</td>
<td>FINAL EXAM: 11:30am closed book &amp; notes</td>
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