Overview

This course introduces students to the use and interpretation of multiple regression analysis and program evaluation. The topical focus will be education, using real data and addressing real policy topics such as class size, teacher certification, education finance and the payoff to education in the labor market. The goals of the class are to:

1) Train students to critically consume empirical research. We will teach you to read and understand technical, empirical studies and to judge whether they constitute a firm, evidentiary basis for policy.
2) Train students to thoughtfully produce their own empirical research. We will develop a core set of analytical tools that will allow you to conduct empirical research in a professional setting.

Prerequisite

Introductory statistics (hypothesis testing, t-statistics, confidence intervals) at the level of PUBPOL 529 or EDUC 793. We’ll have a diagnostic quiz to check your statistical foundations.

Reading

Read the assigned articles and chapters closely before class (see class participation, below). Get the readings early enough that you are not derailed by any technical difficulties.

Textbooks

1) Stock and Watson, Introduction to Econometrics (1st, 2nd or 3rd edition; syllabus references are to 2nd edition).
2) Angrist and Pischke, Mostly Harmless Econometrics.

Articles

We will read papers and reports on education. I will link to these on the course website. If a link is broken, notify me but use the information on the syllabus to find the article (e.g., on Google Scholar). You are responsible for obtaining the readings.
GRADING

In-Section Quizzes (7)  
Quizzes will test material from both the reading and lectures. Quizzes cannot be made up, so plan your schedule accordingly. Your lowest quiz score will be dropped. The quizzes are closed-book. You may consult a single index card of notes during the quizzes.

Homework Assignments (10)  
Homework assignments consist of data analysis and writing short essays (< 1 page) that interpret your findings. They are graded on a scale of 0 to 10. You are encouraged to discuss the assignments in groups of up to three students, but your answers must be written up individually, in your own words. List your study group members on your problem set. Problem sets should be typed and uploaded to the course website.

Class Participation  
During each class, I will ask questions of randomly-selected students. This is intended to encourage democratic participation and discourage napping. Names will be drawn from the class list using a random number generator. The questions will be based on the reading assignments, problem sets and lectures.

Final Exam  
The exam has been scheduled by the Registrar for Friday Dec 16, 1:30-3:30 pm. You may consult a single index card of notes during the exam.

DATA ANALYSIS SOFTWARE
We will program in Stata, a software program used widely by policy analysts. We provide links to online Stata tutorials and offer training in sections. Stata is available in the Ford School computer lab. It is also available for purchase. I recommend you buy it so that you can use it freely and often, the best way to learn any language.

LAPTOP POLICY/TAKING NOTES
To keep us focused on the class and on each other, we will keep laptops closed. I will distribute copies of overhead slides for you to take notes on. If you want to store all class material on your laptop (I do!), transcribing your handwritten notes after lecture is a great a way to nail the material. I will post a PDF of the slides after lecture to facilitate this process.
Syllabus may be updated as the course progresses. Online version is authoritative.

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<tr>
<td>Thurs 9/8</td>
<td>Section – Required Diagnostic Quiz</td>
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<tr>
<td>Wed 9/14</td>
<td>Lecture 3: Causal Inference</td>
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<td>Thurs 9/15</td>
<td>Section – Quiz 1</td>
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<th>WEEK 3</th>
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| Mon 9/19| Assignment 1 due noon
Stock & Watson, Chs. 1 & 3 (to review t-tests, p-values, confidence intervals, hypothesis testing, all of which we will use in class today) |
<p>| Wed 9/21| Lecture 5: Observational Analysis &amp; Introduction to Bivariate Regression | <strong>Readings</strong> | Stock and Watson Ch. 4.1-4.4, Appendix 4.1 |
| Thurs 9/22| Section – Quiz 2 |                     |                     |                     |</p>
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<th>Week 4</th>
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<td>Mon 9/26</td>
<td>Lecture 6: Bivariate Regression &amp; Testing Hypotheses</td>
<td>Stock and Watson Ch 4.5; 5.1-5.2</td>
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<tr>
<td>Tues 9/27</td>
<td>Assignment 2 due noon</td>
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<td>Wed 9/28</td>
<td>Lecture 7: Dummy Variables, Heteroskedasticity</td>
<td>Stock and Watson Ch 5.3</td>
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<td>Thurs 9/29</td>
<td>Section</td>
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<th>Week 5</th>
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<th>Lecture Topic</th>
<th>Readings</th>
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<tr>
<td>Mon 10/03</td>
<td>Lecture 8: Measures of Fit, Interpreting Output</td>
<td>Stock &amp; Watson Ch 5.7, 6.1-6.6</td>
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<tr>
<td>Tues 10/04</td>
<td>Assignment 3 due noon</td>
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<td>Wed 10/05</td>
<td>Lecture 9: Introduction to Multiple Regression</td>
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<td>Thurs 10/06</td>
<td>Section – Quiz 3</td>
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<th>Week 6</th>
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<th>Lecture Topic</th>
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<tr>
<td>Mon 10/10</td>
<td>Lecture 10: Multiple Regression</td>
<td>Stock &amp; Watson Ch. 7.1</td>
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<td>Tues 10/11</td>
<td>Assignment 4 due noon</td>
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<td>Wed 10/12</td>
<td>Lecture 11: Multiple Regression &amp; Hypothesis Tests</td>
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<th>Week 7</th>
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<th>Lecture Topic</th>
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<tr>
<td>Mon 10/17</td>
<td>NO CLASS</td>
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<tr>
<td>Wed 10/19</td>
<td>Lecture 12: Causality and Multiple Regression</td>
<td>Angrist &amp; Pischke Ch 3 through 3.2.3 (skim very technical stuff, get the gist)</td>
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Thurs 10/20  Section – Quiz 4

WEEK 8
Mon 10/24  Lecture 13: Multiple dummies, multicollinearity

Readings
Stock & Watson Ch. 6.7

Tues 10/25  Assignment 5 due noon

Wed 10/26  Lecture 14: Nonlinear Relationships: Polynomials

Readings
Stock & Watson Ch. 8 through 8.2

Thurs 10/27  Section

WEEK 9
Mon 10/31  Lecture 15: Nonlinear Relationships: Polynomials

Readings
Stock & Watson Ch. 8 through 8.2

Tues 11/01  Assignment 6 due noon

Wed 11/02  Lecture 16: Nonlinear Relationships: Logs

Readings
Stock & Watson Ch. 8 through 8.2

Thurs 11/03  Section – Quiz 5

WEEK 10
Mon 11/07  Lecture 17: Interaction Terms

Readings
Stock & Watson Ch. 8.3-8.5

Tues 11/08  Assignment 7 due noon

Wed 11/09  Lecture 18: Interaction Terms

Readings
Thurs 11/10  Section

WEEK 11
Mon 11/14  Lecture 19: Fixed Effects

Readings
Angrist & Pischke Ch 5 (through 5.1)

Tues 11/15  Assignment 8 due noon

Wed 11/16  Lecture 20: Fixed Effects

Thurs 11/17  Section – Quiz 6

WEEK 12
Mon 11/21  Lecture 21: Fixed Effects, Panel Data

Readings
Angrist & Pischke, Ch 5.2

Tues 11/22  Assignment 9 due noon

Wed 11/23  NO CLASS (Happy Thanksgiving)

WEEK 13
Mon 11/28  Lecture 22: Binary Dependent Variables: Linear Probability Model

Readings
Stock & Watson Ch. 11.1-11.2


Wed 11/30  Lecture 23: Binary Dependent Variables: Probit and Logit

Readings
Stock & Watson Ch. 11.4-11.5

Thurs 12/01  Section – Quiz 7

WEEK 14
Mon 12/05  Lecture 24: Instrumental Variables
Readings
Angrist & Pischke, Ch 4 (through 4.1.2)
Stock & Watson Ch 12.1-12.3

Tues 12/06   Assignment 10 due noon

Wed 12/07   Lecture 25: IV in Randomized Trials


Distribute reading for final exam.

Thurs 12/08   Section

WEEK 15
Mon 12/12   Final Lecture

Fri 12/16   Final Exam, 1:30PM - 3:30PM