University of Pittsburgh
Graduate School of Public and International Affairs
PIA 2023: Intermediate Quantitative Methods
Spring 2013

Professor Luke Condra

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Class meets Tuesdays in 3911 Posvar Hall, 12:00 p.m. – 3:00 p.m.

Course Description

Imagine that you are a newly minted MPA/MPIA/MID and have the good fortune of landing a job working for the World Bank in India. Your first substantial project is to assist on a multi-year, multi-sector rural development and poverty reduction program with a budget of $150 million. The project's goals are to broadly improve the livelihoods and quality of life of the poorest of the poor in Andhra Pradesh. As a new member of the team that will develop the Project's next phase of initiatives, the Task Team Leader has asked you to review the results of the Project's initial phase of activities and to make some recommendations to the team for how to improve the Project's next phase, based on your review of raw household survey data that were collected to establish a baseline assessment of household livelihood levels and to help inform policy development. You first grab the Project Appraisal Document that gives a short summary of findings from the survey and find out that, unsurprisingly, manual labor is the main source of livelihood for the poor, their lives are characterized by frequent illness, they have no land of their own, they are uneducated and have few schools, and they find obtaining credit difficult.[1] This provide you with very little help, and so you open the dataset to (a) understand what the project already has achieved in terms of results and (b) develop ideas for what kinds of policies you think are most likely to be successful in achieving stated Project goals. Course work in policy analysis and the economics of development would prepare you to design policy in an intelligent and efficient way. This course should prepare you to make sense of those data.

This course provides an introduction to econometrics for the social scientist and policy analyst. While we will cover some basics of econometric theory, our emphasis will be on applying econometric techniques to practical problems of the kind likely to confront the applied researcher or practitioner. The course begins with a review of probability theory and basic statistics, but the

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[1] Project Appraisal Document on a Proposed Credit in the Amount of SDR 114 Million (US$150 Million Equivalent) to India for the Andhra Pradesh Rural Poverty Reduction Project, January 14, 2003. World Bank Development Sector Unit, India Country Unit, South Asia Regional Office, p. 43. (Project ID P071272).

student is expected to have taken an introductory statistics course or be familiar with such material. The course is divided into two parts. In Part I, we introduce the main topic of the course, regression analysis, and concentrate on understanding the assumptions underlying it, as well as how to apply it in practice. Part I concludes with the midterm exam. Part II provides a brief introduction to other topics that follow from this basic model: time series and panel regression, regression with a limited dependent variable, instrumental variables regression, and experiments. As each of these topics easily can fill a course on its own, the student is encouraged to seek out such courses that cover those methods in greater detail as part of his/her academic program.

Statistical Software
To learn and practice the techniques we learn in class, students will need to have personal access to a statistical software program. In lectures and in-class exercises, we will use Stata, which is available to students through GSPIA. If the student already uses a different program and is familiar with it (e.g., SPSS, R, etc.), you are free to continue using it for this course. You will use this software to analyze data of your choosing in completing a data analysis project due at the end of semester. A very helpful tutorial for getting started with Stata is available from the text's online companion website in PDF format. There is a Web book on some of Stata's commands via UCLA. UCLA hosts an extremely useful site with Stata instructions, data, and forums to get answers to questions.

Materials
Required
As the primary course text we will use James H. Stock and Mark W. Watson, *Introduction to Econometrics* (3rd edition), Prentice Hall, 2010 (ISBN: 0138009007). This text is required and available at the University Bookstore or from an online retailer.

Not required but perhaps helpful
- Joshua D. Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics* (Princeton: Princeton University Press, 2009). Available at the University Bookstore.
- J. Scott Long, *Regression Models for Categorical and Limited Dependent Variables* (Thousand Oaks, CA: Sage, 1997).
- J. Scott Long and Jeremy Freese, *Regression Models for Categorical Dependent Variables Using Stata*, 2d ed. (College Station, TX: Stata Press, 2006).
- Michael N. Mitchell, *A Visual Guide to Stata Graphics* (College Station, TX: Stata Press, 2004).

Course Objectives
Graduates of this course should be able to:
1. Read and understand basic empirical research in the social sciences.
2. Understand the mathematical theory behind basic econometric techniques.
3. Appreciate the limitations of econometric models in identifying causal relationships.
4. Conduct the data analysis necessary to provide answers to basic questions about social and political behavior.

The course teaches students econometric theory (lectures and text) and requires application of that theory in small doses (homework and article review) culminating in the data analysis project.

Course Requirements
1. Homework. (20%)
2. Data analysis project is due on April 23. (30%)
   - A summary of the project (question, data, initial answers to Angrist and Pischke's research process questions) is due February 12.
   - A one-page report on the data (e.g., summary statistics, preliminary results) is due March 19.
3. A mid-semester in-class exam on March 5. (20%)
4. A final semester in-class exam on April 23. (30%)

Grading Policy
GSPIA's grading policy is based on the premise that work at the graduate level is fundamentally different from that at undergraduate institutions. Expectations regarding student performance will be higher.
- "A" signifies an exceptional level of achievement. The student displays a superb command of the subject matter and can creatively apply it at many different levels.
- "B" indicates a good but not outstanding level of achievement. B students demonstrate a decent grasp of the material and the ability to apply at several but not all levels.
- Grades in the "C" range are an indication of below satisfactory performance at the graduate level, with marks of "C-" and below not counted toward a student's degree requirements. Students receiving grades of "C+" or lower on early assignments are urged to meet with the instructor at the earliest opportunity to identify potential problems and develop strategies for improvement.

Assignment and final grades will be given out based on a criterion-referenced grading system; in other words, there is no "curve."
PLEASE NOTE THAT I WILL NOT ACCEPT WORK THAT IS SUBMITTED PAST THE DEADLINE, BARRING A LEGITIMATE EMERGENCY. PLEASE PLAN ACCORDINGLY.

Cheating and Plagiarism

Plagiarism is "the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one's own original work." It is a serious violation of academic ethics. Please note that I adhere strictly to the school policy on plagiarism. Any assignment found to have plagiarized material will automatically receive a failing grade, and serious cases of plagiarism can result in a failing grade for the class, so take the time to familiarize yourself with the rules of citation and with GSPIA's policy (found in Appendix A of the online GSPIA Handbook of Academic Policies and Procedures). If you have any questions about this issue, please ask me directly. Unless clearly specified, you are expected to complete all assignments individually.

Special Needs

If you have a disability for which you may be requesting an accommodation, you are encouraged to contact both me and Disability Resources and Services, 140 William Pitt Union, (412) 648-7890/ (412) 383-7355 (TTY), as early as possible in the semester. DRS will verify your disability and determine reasonable accommodations for this course.

Course Schedule

Week 1 (January 8): Course Introduction
Required
Stock and Watson, Ch. 1.

Recommended
Angrist and Pischke, Ch.1-2.
Steve Lohr, "The Age of Big Data," *New York Times* (February 11, 2012).

*Obtain access to a Stata license this week.
*Download the datasets used in the text from the online companion website to practice with through the semester.
*Begin planning your data analysis project!

Week 2 (January 15): Probability and Statistics Review
*Guest presentation: Lois Kepes, Pitt Librarian
Required
Stock and Watson, Ch. 2-3.

Recommended
Larry Bartels, "Morphing Zombies," *Monkey Cage* (February 15, 2012).
John Sides, "Zombie Politics: The Voting Behavior of the White Working Class," *Monkey Cage*
        (February 14, 2012).
Andrew Gelman, "Understanding the 'Zombie' Confusion about Class and Voting," *Monkey
        Cage* (February 17, 2012).

Week 3 (January 22): Introduction to Linear Regression
Required
Stock and Watson, Ch. 4.

Recommended
Stock and Watson, Ch. 15
Angrist and Pischke, Ch. 3.

Week 4 (January 29): Bivariate Regression: Hypothesis Tests and Confidence Intervals
Required
Stock and Watson, Ch. 5 (skip 5.6).

Week 5 (February 5): Introduction to Multiple Regression
Required
Stock and Watson, Ch. 6

Week 6 (February 12): Multiple Regression: Hypothesis Tests and Confidence Intervals
*Note: part of data analysis paper due
Required
Stock and Watson, Ch. 7

Week 7 (February 19): Nonlinear Regression Functions
Required
Stock and Watson, Ch. 8

Week 8 (February 26): Reviewing Regression Analysis
Required
Stock and Watson, Ch. 9

Week 9 (March 5): Midterm Exam (in class)

Week 10 (March 19): Regression with Panel Data
*Note: part of data analysis paper due
Required
Stock and Watson, Ch. 10
Richter, Brian Kelleher, Krislert Samphantharak, and Jeffrey F. Timmons. 2009. "Lobbying and Taxes." *American Journal of Political Science* 53, no. 4 (October): 893-909.

Recommended
Angrist and Pischke, Ch. 5

Week 11 (March 26): Regression with a Limited Dependent Variable
Required
Stock and Watson, Ch. 11
Fearon, James D. and David D. Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97, no. 1 (February): 75-90.

Week 12 (April 2): Instrumental Variable Regression
Required
Stock and Watson, Ch. 12
Tom Pepinsky, "Identification Is Neither Necessary Nor Sufficient for Policy Relevance," *Indolaysia* (February 8, 2012).

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91, no. 5 (December): 1369-1401.

Levitt, Steven D. 1997. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *American Economic Review* 87, no. 3 (June): 270-90.

Recommended
Angrist and Pischke, Ch. 4

Week 13 (April 9): Time Series
Required
Stock and Watson, Ch. 14
Jaeger, David A. and M. Daniele Paserman. 2006. "Israel, the Palestinian Factions, and the Cycle of Violence." *American Economic Review* 96, no. 2 (May): 45-49.

Week 14 (April 16): Experiments and Quasi-Experiments
Required
Stock and Watson, Ch. 13
John Sides, "Smart Power Meets Field Experiment," *Monkey Cage* (July 2, 2012).
Gerber, Alan S., Donald P. Green, and Christopher W. Larimer. 2008. "Social Pressure and Voter Turnout: Evidence from a Large-Scale Field Experiment." *American Political Science Review* 102, no. 1 (February): 33-48.

Recommended
Angrist and Piscke, Ch. 6
Banerjee, Abhijit V. and Esther Duflo. 2009. "The Experimental Approach to Development Economics." *Annual Review of Economics* 1: 151-78.
Duflo, Esther, Rachel Glennerster, and Michael Kremer. December 12, 2006. "Using Randomization in Development Economics Research: A Toolkit." Working paper.
Sekhon, Jasjeet S. and Roco Titiunik. 2012. "When Natural Experiments Are Neither Natural nor Experiments." *American Political Science Review* 106, no. 1 (February): 35-57.

Week 15 (April 23): Final Exam (in class)