

**Economics 590  
(3 credit hours)**

**Statistical Methods for Program Evaluation**

**Teaching mode: Weekly scheduled synchronous in person class meetings in Gardner 307**

**Syllabus**

David Guilkey

[david\\_guilkey@unc.edu](mailto:david_guilkey@unc.edu)

Gardner 208c

Office hours: 2 PM MW (by zoom: <https://unc.zoom.us/j/5532840045>)

Midterm: March 2 (20%)

Critical Paper Reviews – three (10%)

Stata exercises – four (10%)

Ten minute power point (or equivalent) presentation on paper – 5%

Original Research Paper (30%)

Final Exam: May 5 at 12PM (25%)

**Recommended Textbooks:**

There are three recommended “textbooks” that can be used to supplement my class notes. The pdf’s are in the textbook folder on the class website:

Impact Evaluation in International Development: Theory, Methods and Practice by Glewwe and Todd

How Do We Know if a Program Made a Difference? A Guide to Statistical Methods for Program Evaluation by Lance, Guilkey, Hattori and Angeles

A Guide to Longitudinal Program Impact Evaluation by Angeles, Cronin, Guilkey, Lance and Sullivan

**Course Computer Software**

Stata: Students may want to buy a student edition since there is no book to buy. It is also available in Citrix but students sometimes have trouble getting access at busy times. Stata has an extensive set of treatment effects estimation methods that are described in the manual accompanying the software package. This manual not only presents the Stata commands, it also presents methods, formulas, an explanation of the method and examples. You can consider this to be an additional textbook and probably your most valuable resource other than the class notes.

**Prerequisites:**

The pre-requisites are Econ400, ECON410 and Econ 470 (Econometrics). Must have received a grade of B or better in ECON470.

**Course description:**

The purpose of this course is to teach statistical methods for program evaluation. During the course of my career, I have evaluated a wide variety of public and private programs for organizations such as the US Department of Agriculture (USDA), the World Bank, the US Agency for International Development (USAID), and the Gates Foundation. For example, for USDA I have written papers that have examined the impact of the school lunch and breakfast programs, for USAID I evaluated a program to improve family planning in Tanzania and I also did similar evaluations in Colombia, Tunisia and Zimbabwe for the World Bank. For the past 14 years, I have had funding from the Gates Foundation to study several of their interventions in India, Kenya, Senegal, and Nigeria.

Most lectures will involve a discussion of a published research paper that conducted an evaluation. First, I will explain the statistical method used in the paper. In many cases, the methods used will be methods that are covered in ECON470 and so this will be a review. There will also be instances where more advanced methods or methods that are not typically covered in ECON470 are used which will require more detailed explanation and, in some cases, methods are used that are beyond the level for an undergraduate course and so I will just provide an intuitive understanding for why they are appropriate. In some cases, the papers will be ones where I am a co-author since I can give more detailed background in these instances. In several of these studies, I was involved from the “ground up” where I helped design the evaluation, was involved in the data collection, and then conducted the statistical analysis.

The grade will be determined by a midterm and final exam which will consist of short answer questions designed to gauge the student’s level of understanding of the material. Part of this will involve the interpretation of Stata output. In addition, there will be a 20 to 30 double spaced pages research paper described in more detail in the research paper attachment. The paper will have several deadlines over the course of the semester including a 15 minute oral power point (or equivalent) presentation near the end of the semester. The paper itself will be due the last day of class.

Ten percent of the grade will be critical reviews of papers (described in more detail below). Finally, there will be Stata exercises using data sets that I have used in evaluations over the years. These exercises will be due at the beginning of class, one week after they are posted.

**Critical reviews of papers**

These reviews will be between 1.5 and 2 pages long. Here are the issues that you should address:

1. What is the primary question/issue/hypothesis that the author wanted to address?
2. Why is the question interesting or important?

3. What data does the author use (if empirical paper)?
4. Give an intuitive description of the author's test or model.
5. What are the author's main findings or conclusions?
6. Are you convinced by the author's results/arguments? Why or why not?
  - a. Do you believe they found a causal relationship? Why or why not?
  - b. Did the results obtained justify the interpretation and conclusions?
  - c. Were appropriate controls used or did the approach adequately test the hypothesis?
  - d. Do you think the results could be biased in some way? Explain.

### **Course Outline and Tentative Semester Schedule:**

#### **Weeks 1 and 2**

Overview of program evaluation

Definition of treatment effects

Measuring treatment effects with experimental data

Basic tests involving differences in means or proportions

Regression adjusted tests for using continuous or binary outcomes (OLS, Probit and Logit)

Importance of correcting for heteroskedasticity and clustering

#### **Weeks 3 and 4**

##### **Estimation of program effects using cross sectional observational data**

Creating an analysis data set from either Demographic and Health Survey (DHS) or Performance Monitoring for Action (PMA) cross sectional data sets

Creating an analysis data set from US census (ACS – American Community Survey)

Methods when the treatment or program is assumed to be exogenous after controlling for observed variables (sometimes referred to as strong ignorability)

Continuous outcome (OLS)

Binary outcome (probit and logit)

Categorical outcome (multinomial logit)

Propensity score matching methods

#### **Weeks 5 and 6**

##### **Methods when the treatment or program is potentially endogenous using cross sectional observational data**

Instrumental variables methods for continuous or discrete outcomes

Maximum likelihood methods

Stata eteffects method

## **Week 7 Review and Midterm Exam**

## **Week 8**

### **Estimation of program effects using repeated cross sectional observational data**

Difference in differences methods

## **Weeks 9, 10, and 11**

### **Estimation of endogenous program effects using longitudinal and multilevel observational data**

Creating an analysis data set from the Add Health Longitudinal Survey (public use version)

Relationship to Pre-test/Post-Test experimental design

Fixed effects and correlated random effects

Longitudinal based methods to deal with program targeting

Extension to binary and categorical outcome variables

### **Extra Topics if we have time**

**Discrete time hazards method**

**Quantile regression estimates of treatment effects**

**Regression discontinuity estimators**

## **Weeks 12, 13 and 14 (number of class periods used will depend on the size of the class)**

Ten minute in class Power Point (or equivalent) presentations

### **Grading Policy:**

The midterm and final exams are tentatively scheduled to be in person on the days listed above. The Stata exercises and the paper reviews will be due at the beginning of class one week after they are posted. All work will be graded on a 100 point scale. The final grade is determined by the weights given above. Letter grades are determined from the following scale where the grades will be adjusted so that the median score is 88 if the raw score is less than 88.

100 – 93	A
92-90	A-
89-87	B+
86-83	B
82-80	B-

79-77	C+
76-70	C
69-60	D
59 -0	F

### **Policy for Missing the Midterm:**

If a student misses the midterm, the weight of that midterm in the course grade will be added to the final exam. An exception will be made for University-approved absences (see <http://catalog.unc.edu/policies-procedures/attendance-grading-examination/>); students with this type of absence may request a make-up examination at a time convenient to both student and instructor.

### **Code of Conduct:**

Students are bound by the Honor Code in taking exams and in written work. The Honor Code of the University is in effect at all times, and the submission of work signifies understanding and acceptance of those requirements. Plagiarism will not be tolerated. Please consult with me if you have any questions about the Honor Code.

### **Counseling and Psychological Services:**

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: <https://caps.unc.edu> or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

### **Accessibility Resources & Services:**

UNC-Chapel Hill facilitates the implementation of reasonable accommodations for students with learning disabilities, physical disabilities, mental health struggles, chronic medical conditions, temporary disability, or pregnancy complications, all of which can impair student success. See the ARS website for contact and registration information: <https://ars.unc.edu/about-ars/contact-us>.

### **University Testing Center**

The College of Arts and Sciences provides a secure, proctored environment in which exams can be taken. The center works with instructors to proctor exams for their undergraduate students who are not registered with ARS and who do not need testing accommodations as provided by ARS. In other words, the Center provides a proctored testing environment for students who are unable to take an exam at the normally scheduled time (with pre-arrangement by your instructor). For more information, visit <http://testingcenter.web.unc.edu/>.