

PUBLIC POLICY ANALYSIS 460
QUANTITATIVE METHODS FOR PUBLIC POLICY
SYLLABUS – FALL 2012
TUESDAY THURSDAY: 12:30 AM – 1:45 PM, WILSON 0128

INSTRUCTOR

Manisha Goel

Assistant Professor, Dept. of Public Policy

E-mail: mgoel@unc.edu

Office: Abernethy 208 (167 South Columbia Street)

Office Hours: Tu 2:00 PM – 3:00 PM, Th 11:00 AM – 12:00 PM, and by appointment

TEACHING ASSISTANTS

Lisa Spees

Email: lspees21@email.unc.edu

Office: Carolina Population Center 525

Office Hours: Tuesday 2:00 PM – 3:00 PM

Jesse Hinde

Email: hinde@live.unc.edu

Office: Abernethy 214

Office Hours: Thursday 2:00 PM – 3:00 PM

Note: Both teaching assistants will provide extended office hours when assignments are due and before exams.

RECITATIONS

Note: You must be enrolled in and must attend a recitation section.

Section 602: F 10:00 AM – 10:50 AM Bingham 0309 (Lisa Spees)

Section 603: F 11:00 AM – 11:50 AM Dey 0403 (Jesse Hinde)

Section 604: F 12:00 PM – 12:50 PM Phillips 0228 (Jesse Hinde)

COURSE WEBSITE

The website for the course is: <http://www.sakai.unc.edu>. All announcements and course materials will be posted on this website.

REQUIRED TEXTS:

- Agresti and Finlay (AF hereafter), *Statistical Methods for the Social Sciences*, 4th ed., 2009.
- Allison, Paul D., *Multiple Regression: A Primer*, 1999.

OPTIONAL TEXT:

Acock, Alan C., *A Gentle Introduction to Stata*, 2006.

COURSE OBJECTIVES

The objective of this course is to provide students with the knowledge and skills necessary to categorize, describe, analyze, and interpret data that can inform public policy decision-making and contribute to our understanding of the impact of public policies. This course will emphasize the application of statistical concepts and methodologies to the analysis of social issues in public policy, including the limitations of quantitative methods in generating answers to social policy questions. The course covers data definitions and measurement, description of univariate and bivariate distributions, statistical testing, correlation, simple linear regression, and multiple linear regression.

COURSE OVERVIEW

In the first few classes, we will review what you have learned in the pre-requisite courses, but we will also discuss critical thinking about the choices we make in identifying relevant data or variables for analysis, and how the types of data affect the statistical tools we choose for analyses.

Next, we will go beyond the description of relationships between variables to making inferences about observed relationships that might apply to a larger group for which we want to make generalizations. This is known as inferential statistics: the application of methods of probability to the analysis and interpretation of empirical data. The main statistical techniques for making judgments about the generalizability of relationships are tests of statistical significance. We will apply these concepts using statistical techniques such as *t*-test of means and *z*-test of proportions and the chi-square test for contingency tables.

Then, we introduce more complex methods of statistical inference and data analysis – correlation and regression analysis. The use of these methods is motivated by the fact that the complexities of both human and institutional activities in the real world demand a more sophisticated strategy for understanding and producing useful information about public policy decision-making and the impact of public policies. Correlation and regression analysis and the application of these methods to public policy programs will build on the concepts learned earlier in the course, and will be applied to public policy issues. The course emphasizes ordinary linear regression for continuous outcomes, but also introduces logistic regression for binary outcomes.

APPLIED DATA ANALYSIS

The course emphasizes hands-on application of the techniques discussed in class using statistical software and real data. Problem sets and memo assignments will involve data used by scholars and policy analysts to inform public policy decision-making. We will use the software package Stata and a variety of datasets to examine the determinants of child well-being and young adult outcomes and the role of public policy in improving such outcomes.

You may purchase a one-year license of Stata IC 12 (\$98) and load it on your laptop. See <http://www.Stata.com/order/new/edu/gradplans/gp-campus.html> for more details about this particular version of Stata (note: that we will be using datasets that are too large for “Small Stata.”) Those who do not wish to purchase a one-year license of Stata may use a web-based cloud-computing resource, the Virtual Computing Lab (<https://vcl.unc.edu/index.php?mode=selectauth>) to access Stata. You may also use Stata on any library computer or in any campus computer lab.

STUDENT EVALUATION

Your grade will be based on your performance on the following tasks:

- Five textbook exercise assignments (will be reviewed at end of semester and fed into Class Participation’ grade)
- Three problem sets
- Midterm Exam
- Bivariate hypothesis testing memo
- Regression analysis memo
- Final Exam
- Class participation

The fraction of the points allocated to each task is shown below. The grading scheme is designed to reward improvement. Spreading the grades over several activities also ensures that one bad performance does not ruin your overall grade. The problem set with the lowest score will be dropped. An alternative grade breakdown is provided for students who do poorly on the midterm but better on the final, and poorly on the second memo (which students might find harder), but better on the first memo. Your score will be calculated using both point allocations, and the highest score will be chosen.

	Grade Breakdown	Alternative Grade Breakdown
Best 2 Problem Sets (5% each)	10%	10%
Bivariate Hypothesis Testing Memo	10%	15%
Regression Analysis Memo	20%	15%
Midterm Exam	25%	15%
Final Exam	30%	40%
Class Participation (includes textbook exercises)	5%	5%

The grades will be based on a curve and assigned as follows:

- Top 20% of the class: A / A-
- Next 30% of the class: B+ /B / B-
- Below 50% of the class but with at least a score of 35/100: C+ / C

Note: a minimum of a C is required for this course to count towards the public policy

major or minor.

EXAMS

Exams for this course are designed to test the knowledge of students throughout the skill distribution, including those with prior experience with statistics. Therefore, the exams will be difficult. The tests will be in-class. The instructor will provide key equations and formulas so that you do not have to ‘memorize’ and can focus on applying the appropriate equation to the questions.

TEXTBOOK EXERCISES

Exercises will not be graded but completed assignments must be posted to Sakai by the submission deadline. These will be reviewed at the end of the semester and overall quality will feed into the final Class Participation grade. The homework assignments will be especially important in deciding borderline cases—final point scores that lie on the border between letter grade cut-offs. Late assignments will not be accepted. Solutions will be posted the day after due dates.

PROBLEM SETS

Problem sets will be graded on a 0 to 5 scale, with 0 being not turned in or mostly incomplete and incorrect, 3 being complete and mostly incorrect, and 5 being complete and mostly correct. Late assignments will not be accepted.

MEMOS

The memos will allow you to formulate and test a policy-relevant research hypothesis of your choosing using one of the datasets used in the course. These will require data manipulations with a statistical analysis software package (Stata), using your critical thinking skills and knowledge about the uses and limits of public policy to formulate an appropriate research hypothesis, and the ability to properly formulate and interpret statistical data analysis. The first memo will require a bivariate hypothesis test. The second memo will require both a bivariate hypothesis test and a multiple regression analysis. Consistent with the standards above, memos will be graded on the following scale: A (5) – exemplary, B (4) – proficient, C (3) – fair, D (2) – basic, E (1) – below basic, F (0) – no memo turned in or assignment incomplete in most respects. Late memos will be penalized one letter grade per 24 hour period.

For details on how to appropriately reference your sources, please consult the most recent edition of one of the following texts: Turabian’s *A Manual for Writers*, *The Chicago Manual of Style*, Strunk & White’s *The Elements of Style*, or the *Publication Manual of the American Psychological Association* (for APA style).

Assignment Submission Guidelines and Extensions

All assignments will be submitted to Sakai for a “date and time stamp”. Hard copies of problem sets and memos (only) will also be submitted at the beginning of the class immediately following the e-submission deadline. Failure to submit a hardcopy will limit

the amount of feedback we can provide on the assignment.

The late assignment policy will apply to the date and time on which an assignment was received by Sakai. If technical problems prevent you from submitting your first assignment (Exercise 1 due August 31) to Sakai, you will receive an automatic grace period of 24 hours provided you also submit documentation that your technical problem was genuine (e.g., a tech support “help ticket.”). No such grace periods will apply to assignments subsequent to the first. You are expected to verify that your assignments have been properly submitted. Remember, points will be subtracted from late memos only—late exercises and problem sets will not be accepted.

If personal or extenuating circumstances prevent you from turning in an assignment on time, please contact the instructors as soon as possible *in advance* of the deadline. Extensions will be handled on a case-by-case basis, but job interviews, work commitments, weddings, and academic workload issues will generally not be considered valid reasons for extensions. Medical emergencies and genuine exogenous shocks, with documented proof, may be grounds for an extension.

MISSED EXAMS

There will be no make-up exams. Students with valid excuses (typically medical emergency or similar exogenous shock) will have their exam grades reweighted, with other exams taking on more weight.

CLASS PARTICIPATION

Five percent of your grade will be based on class participation. This includes your attendance in class and labs, willingness to ask and answer questions, constructive participation in discussion, submission and quality of homework assignments, and adherence to the norms of academic behavior, as noted below. Discussion of class material with me and the TAs during office hours will also contribute positively to this aspect of your mark.

GRADE APPEAL POLICY

I take the evaluation and grading of your work very seriously because I know that most of you take your work very seriously, and because every grade affects your final GPA. If you think you deserve a higher grade on a paper or exam, you may write a letter and explain why you would like to appeal the grade. I must receive this letter within 7 days of you receiving back your graded test or assignment. After I receive your letter, we will re-read your paper/exam. Depending on our re-reading, your grade may stay the same, be raised, or be lowered. This system is designed to ensure that you have carefully examined and reflected on the quality of your work before deciding to initiate a grade appeal.

NORMS OF ACADEMIC BEHAVIOR

The purpose of lectures and recitations is to enhance your understanding of material covered in the textbooks. To state the obvious, to get the most out of these experiences you must come to class prepared and on time, get enough sleep the night before, and avoid any distractions that might hinder your learning. Failing to read outside of class,

coming to class late, falling asleep and/or text messaging during class is detrimental to your and others' learning. You will be expected to complete all reading assignments prior to the class meeting; lectures are a supplement to, and not a replacement for, reading outside of class time. The use of laptop computers will be required in all Friday recitations. The use of a basic calculator will be required during exams. **During lectures, however, please refrain from using electronic devices (phones, MP3 players, and laptops).** Anyone caught using an electronic device for an inappropriate use during lecture will have the device confiscated for the class period or asked to leave. Anyone caught twice for such an infraction will face further disciplinary action including low marks for class participation.

All students should become familiar with the rules governing alleged academic dishonesty. All students should be familiar with what constitutes academic dishonesty, especially as it applies to plagiarism and test taking. Ignorance of the rules governing academic dishonesty is not an acceptable defense.

HONOR CODE

The honor code is on effect in this class and all others at the University. We are committed to treating Honor Code violations seriously and urge all students to become familiar with its terms set out at <http://instrument.unc.edu>. If you have questions, it is your responsibility to ask us about the Code's application. It is assumed that all exams, written work, and assignments submitted by you are in compliance with the requirements of the Honor Code.

STUDENTS WITH DISABILITIES

Students with disabilities that have been certified by the Department of Disabilities Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs.

COURSE SCHEDULE

Note: "AF" refers to Agresti & Finlay's textbook, "Ex" refers to textbook exercise assignment, and "PS" refers to problem set.

Tu., Aug. 21 – Review of basic concepts, AF 1, AF2
Th., Aug. 23 – Review contd., AF 3, **Ex 1 Given Out**
Fr., Aug. 24 – Lab: Stata on VCL, Introduction

Tu., Aug. 28 – Probability, AF 4
Th., Aug. 30 – Probability, AF 4
Fr., Aug. 31 – Lab: Stata on VCL, Introduction, **Ex 1 Due 9:00 AM**

Tu., Sept. 4 – Statistical inference: estimation AF 5
Th., Sept. 6 – Statistical inference: one sample significance tests, AF 6, **Ex 2 Given Out**
Fr., Sept. 7 – Lab: Recoding variables in Stata

Tu., Sept. 11 – Statistical inference: one sample significance tests, AF 6
Th., Sept. 13 – Comparison of two groups, AF 7
Fr., Sept. 14 – Lab: Tables and graphs of different types of variables, **Ex 2 Due 9:00 AM**

Tu., Sept. 18 – Comparison of two groups, AF 7, **Problem Set 1 Given Out**
Th., Sept. 20 – Contingency Tables, AF 8
Fr., Sept. 21 – Lab: Bivariate tests in Stata

Tu., Sept. 25 – Contingency Tables, AF 8
Th., Sept. 27 – Linear regression and correlation, AF 9, **Problem Set 1 Due 11:30 AM, Ex 3 Given Out**
Fr., Sept. 28 – Lab: Contingency tables in Stata

Tu., Oct. 2 – Linear regression and correlation, AF 9, **Bivariate Memo Given Out**
Th., Oct. 4 – Linear regression, parameter estimation, AF 9, Allison 5
Fr., Oct. 5 – Lab: More bivariate analysis in Stata, **Ex 3 Due 9:00 AM**

Tu., Oct. 9 – Midterm Review
Th., Oct. 11 – **Midterm Exam**
Fr., Oct. 12 – University Day. No recitations.

Tu., Oct. 16 – Linear regression, model fit, AF 9, **Bivariate Memo Due 11:30 AM, Ex 4 Given Out**
Th., Oct. 18 – Fall Break
Fr., Oct. 19 – Fall Break

Tu., Oct. 23 – Linear regression, model assumptions and violations, AF 9, Allison 6, **Problem Set 2 Given Out**
Th., Oct. 25 – Linear probability regression, AF 15.1 p.484
Fr., Oct. 26 – Lab: Linear regression in Stata, **Ex 4 Due 9:00 AM**

Tu., Oct. 30 – Correlation, causation, and confounding, AF 10
Th., Nov. 1 – Statistical control and types of multivariate relationships, AF 10, **Problem Set 2 Due 11:30 AM**
Fr., Nov. 2 – Lab: Linear regression in Stata

Tu., Nov. 6 – Multiple linear regression, AF 11 (skip 11.7), Allison 1
Th., Nov. 8 – Multiple linear regression, AF 11 (skip 11.7), Allison 2, **Ex 5 Given Out**
Fr., Nov. 9 – Lab: Controlling for a variable in Stata

Tu., Nov. 13 – Regression with categorical predictors, interactions, and non-linearities, AF 13.1-13.4, AF 14.5, Allison 8
Th., Nov. 15 – Multicollinearity, AF 14, Allison 7
Fr., Nov. 16 – Lab: Example of regressions for memo, **Ex 5 Due 9:00 AM**

Tu., Nov. 20 – Applied regression, direction of bias, Allison 3, **Problem Set 3 and Multiple Regression Memo Given Out**

Th., Nov. 22 – Thanksgiving Recess

Fr., Nov. 23 – Thanksgiving Recess

Tu., Nov. 27 – Other problems with multiple linear regression and solutions, Allison 3

Th., Nov. 29 – Other problems with multiple linear regression and solutions, Allison 3,

Problem Set 3 Due 11:30 AM

Fr., Nov. 30 – Lab: Memo help session

Tu., Dec. 4 – Final Review, **Multiple Regression Memo Due 11:30 AM**

Tuesday, December 11, 12:00 Noon - 3:00 PM - Final Exam - Held in Normal Class Room. Cumulative, but emphasis on material covered post-midterm.