PUBP 602 Quantitative Methods I

Fall 2011, Section 01, CRN 10558

Professor Paul Manna http://pmanna.people.wm.edu/
Department of Government pmanna@wm.edu
Thomas Jefferson Program in Public Policy 221-3024
30 Morton Hall

Course Meetings: 201 Morton Hall, M 10-10:50am and W 9-10:50am
Office Hours: T 10:00-11:30am, F 2:00-3:30pm, and by appointment
Teaching Assistant: Jason Saunders, jxsaunders@email.wm.edu, office hours M&W 12:30-2:00

1. Course overview

Quantitative evidence has become increasingly important for developing solutions to challenging policy problems. However, statistics do not "speak for themselves." If poorly generated they mean nothing or can do great harm. If poorly presented or explained they can misinform, mislead, or confuse their audiences. Thus, possessing the ability to create, interpret, and present quantitative evidence is essential for anyone beginning a career in public policy. Even if you never personally generate statistical results after you leave William & Mary you will inevitably have to evaluate the quantitative findings of others.

With that preface let me welcome you to PUBP 602. This class serves four important purposes. First, it provides an introduction to applied statistical methods. Second, it prepares students for more advanced statistics courses. Third, it emphasizes writing about and communicating statistical results to readers who may lack statistical training. Finally, it will help you develop the habits of mind that will make you careful users of data and statistical computing. To serve those ends, in this class you will develop quantitative skills by actually practicing them.

Some of you may possess little or no quantitative background. That's okay. The work is challenging, but not impossible. If you already have statistical experience, please talk with me immediately to determine whether you should take this course.

2. Course materials

2.1 Readings

We will use the following required text in PUBP 602 and PUBP 603.

- Jeffrey M. Wooldridge. 2009. *Introductory Econometrics, A Modern Approach, 4th edition.* ISBN 9780324581621

These great supplemental references are free.

- Online Statistics: An Interactive Multimedia Course of Study. http://onlinestatbook.com/index.html.
- StatSoft. The Electronic Statistics Textbook. http://www.statsoft.com/textbook/stathome.html.
- UCLA Academic Technology Services. Resources to help you learn and use Stata. http://www.ats.ucla.edu/STAT/stata/.

2.2 Software

As I mentioned during orientation week, we will use the software program Stata in PUBP 602, PUBP 603, and in your other courses such as the Policy Research Seminar. I *strongly* urge you to purchase the program. Fortunately it is available at a discounted rate through the Stata GradPlan. Here's how to purchase it:

- Surf to http://www.stata.com/order/new/edu/gradplans/gp-campus.html.
- On that page, I would recommend purchasing Stata/IC 12 with perpetual license ($179.00) or Stata/SE 12 with perpetual license ($395.00).
- Do NOT buy Small Stata 12. It has very limited capabilities.
- Pick up your order at the Information Technology office in Jones Hall, next to Morton.

3. Assignments and grading

3.1 Grading

I will calculate course grades based on the following items. You need to complete all items to receive course credit. Students not completing all items will receive an Incomplete.

Percent	Item
20	Homework assignments (4 @ 5% each)
30	Exam 1
30	Exam 2
20	Final paper

In general, I will base grades on the following percentage scale with partial-percents typically rounded to the nearest full percent: A=93-100; A–=90-92; B+=88-89; B=83-87; B–=80-82; C+=78-79; C=73-77; C–=70-72; D+=68-69; D=63-67; D–=60-62; F<60.

In a graduate class such as this, any grade below a "B" on any assignment or exam suggests that a student is having trouble grasping basic course ideas, which are essential building blocks for future courses and the work world. Please talk with me if you find yourself having difficulty.

Finally, because errors sometimes creep into grade calculations (and on rare occasions assignments are misplaced after they have been handed in) please keep a copy of all work submitted for this course until final grades have been processed.

3.2 Homework assignments

These assignments will focus on real life policy questions. It is crucial that you complete these assignments on time. Grading will stress two things: (1) the degree to which you have made a strong effort to complete all parts of each assignment; and (2) the extent to which your work, especially the statistical computing component and the writing component, is polished and professionally done.

3.3 Exams

We will have two take-home exams. Both will ask you to perform calculations and will emphasize interpreting results. The exams will be open-book and open-note.

3.4 Final Paper

The course's capstone paper will provide you an opportunity to use your quantitative skills in an area that you choose. I will make some data sets available but you may also use data from another source. More details about the paper will be forthcoming.

4. Other important notes

4.1 Daily class operation

You will develop professional habits of mind and get the most out of class by doing these things.

The night before class:

- Do the readings. Even skimming the relevant pages for 15 minutes will be worth it. Do not expect to understand the material after only one read.
- Check Blackboard for files to download for class. Download handouts, data sets, and Stata .do files to your laptop or your personal H:\ drive. *I strongly encourage you to print out the .pdf handouts that I post to Blackboard*.
- Charge your laptop battery. Unfortunately, outlet power is not always conveniently located in our classroom, so don't rely on plugging in your machine during class.

At the beginning of each class before lecture begins:

- Arrive on time and quietly take your seat if you are late.
- Have Stata running on your laptop computer or be sitting next to someone who does.
- Close your email and Internet entertainment and disable all other electronic distractions.

During class:

- Ask questions when you do not understand something.
- Do not attend to email, the Internet, or other electronic distractions.

4.2 Appropriate use of computers in class

As section 4.1 suggests, your laptops will be powerful educational tools for this class. However, do not let them distract you, your fellow classmates, or me from our in-class work. Students who use laptops in class inappropriately suggest that they possess neither the intellectual focus nor the respect for others needed to do real professional work. Those students end up developing reputations that make it difficult for faculty members to give them strong recommendations to other professors and future employers.

4.3 Academic misconduct

I begin each semester by assuming that academic misconduct will not be an issue, but as a policy matter I mention this on every syllabus. For any questions about policies regarding cheating, plagiarism, or other types of misconduct, please refer to the web site of the William & Mary Honor Council and the relevant pages about the Honor Code from the Student Handbook. If I discover a student violating the Honor Code I will initiate an Honor Council proceeding and, at a bare minimum, recommend to the Council that the student receive an "F" for the course. I take this issue extremely seriously, and hope you do too.

4.4 What you can expect from me

So far I have said a lot about what I expect from you. A fair question, though, is: What can you expect from me? First, and above all, I will not ask you to do things that waste your time. In

fact, everything I will teach or require of you is based on practices of the best professional policy analysts and academic researchers. In my own work I try to live up to the standards I will be teaching you. Second, Jason and I will offer lots of honest feedback in office hours, via email exchanges, and on your written work. If our comments seem confusing, harsh, or unclear then let's talk it over. Finally, I promise to treat you and your ideas with fairness and respect.

5. Schedule

We will adjust this schedule as needed. Any changes to assignment or exam due dates will provide you with more time, not less time, to complete the work. You'll notice that the reading assignments repeat for some days. That is intentional because re-reading certain pages in a new context will help to deepen your understanding of prior concepts and establish new ones.

5.1 Introduction

W 8/24	Course overview
M 8/29	Stata basics

5.2 Data Description

W 8/31	Stata basics (cont.) Types of variables (discrete: binary, categorical, ordinal; and continuous: interval, ratio) • Wooldridge, pp. 714-719 (B.1. Random Variables and Their Probability Distributions)
M 9/5	Describing one variable with numbers and visuals • Wooldridge, pp. 695-697 (section A.1. The Summation Operator)
W 9/7	Describing one variable with numbers and visuals (cont.)
M 9/12	Basic probability rules • Online Statistics, http://onlinestatbook.com/chapter5/basic.html
W 9/14	Describing one variable with probability distributions • Woodridge, pp. 699-702 (A.3 Proportions and Percentages), pp. 714-719 (B.1 Random Variables and Their Probability Distributions), and pp. 722-729 (B.3 Features of Probability Distributions)

Friday, September 16. HOMEWORK #1 DUE BY 5PM.

M 9/19	Describing one variable with probability distributions (cont.) • Wooldridge, re-read section B.1 and B.3, which were assigned for W 9/15, and pp. 737-740 (B.5 The Normal and Related Distributions—stop after Example B.6)
W 9/21	Describing relationships between two variables using contingency tables • Wooldridge, pp. 719-722 (B.2 Joint Distributions, Conditional Distributions, and Independence)
M 9/26	Describing relationships between two variables using scatterplots and correlation • Wooldridge, pp. 729-731 (B.4 Features of Joint and Conditional Distributions, sections on "covariance" and "correlation coefficient")
W 9/28	Describing relationships between two variables using scatterplots and correlation (cont.)

Friday, September 30. HOMEWORK #2 DUE BY 5PM.

M 10/3	Describing relationships between two variables using regression • Wooldridge, appendices. pp. 697-699 (section A.2. Properties of Linear Functions) and pp. 733-734 (B.4 Features of Joint and Conditional Distributions, section on "conditional expectation"—stop reading before getting into "properties of conditional expectation"). • Wooldridge, Chapter 2. The Simple Regression Model, sections 2.1, 2.2 (study the figures; you can skim the text), and 2.3.
W 10/5	No class – TJPPP trip for Washington, DC Program
M 10/10	No class – Fall break
W 10/12	Describing relationships between two variables using regression (cont.) • Wooldridge, re-read assignment from M 10/3

Friday, October 14 – TAKE-HOME EXAM #1 DUE BY 5PM

5.3 Statistical Inference

M 10/17	Population, sample, and sampling distributions • Wooldridge, pp. 747-748 (section C.1 Populations, Parameters, and Random Sampling), and pp. 748-755, focusing in particular on the diagrams (section C.2. Finite Sample Properties of Estimators)
W 10/19	Population, sample, and sampling distributions (cont.) • Wooldridge, pp. 755-759 (section C.3 Asymptotic or Larger Sample Properties of Estimators). The diagram on p. 756 is very important.
M 10/24	Confidence intervals and hypothesis testing • Wooldridge, pp. 762-769 (section C.5 Interval Estimation and Confidence Intervals)
W 10/26	Confidence intervals and hypothesis testing (cont.) • Wooldridge, pp. 770-781 (section C.6 Hypothesis Testing)

Friday, October 28. HOMEWORK #3 DUE BY 5PM.

M 10/31	Confidence intervals and hypothesis testing (cont.) • Wooldridge, re-read pp. 779-781 to make sure you understand the discussion of "the relationship between confidence intervals and hypothesis testing" and "practical versus statistical significance."
W 11/2	Inference for means and differences of means • Online Statistics, http://onlinestatbook.com/chapter10/single_mean.html • Online Statistics, http://onlinestatbook.com/chapter10/difference_means.html
M 11/7	**CLASS WILL RUN 9:00-10:50am** Inference for regression • Online Statistics, http://onlinestatbook.com/chapter12/inferential.html
W 11/9	**CLASS WILL RUN 10:00-10:50am** Inference for regression (cont.)

Friday, November 11. HOMEWORK #4 DUE BY 5PM.

M 11/14	Inference for contingency tables • Online Statistics, http://onlinestatbook.com/chapter14/contingency.html
W 11/16	Inference for contingency tables (cont.)

Monday, November 21. No class meeting – TAKE-HOME EXAM #2 DUE BY 5PM.

W 11/23	No class – Thanksgiving break
M 11/28	Final paper discussion
W 11/30	Multiple regression warmup • Wooldridge, Chapter 2. The Simple Regression Model, sections 2.1, 2.2, and 2.3. • Wooldridge, Chapter 3. Multiple Regression Analysis: Estimation, section 3.1.

Monday, December 12. FINAL PAPER DUE BY 5PM.