PUBP 602 Quantitative Methods I

Fall 2007, Section 01, CRN #10558

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Course Meetings: 201 Morton Hall, Tuesday 9-9:50am and Thursday 9-10:50am
Office Hours: T 10:30-11:30am, W 1-3pm
Teaching Assistant: Cory Kaufman (cjkauf@wm.edu), office hours M & W 3:30-5pm

1. Course overview

Quantitative evidence has become increasingly important for developing solutions to challenging public problems. However, statistics rarely if ever "speak for themselves." If poorly generated, they mean nothing, or worse, can do great harm. If poorly presented and explained, they can misinform, mislead, or confuse their audiences. Thus, knowing how to create, interpret, and present quantitative evidence are essential skills for anyone beginning a career in public policy. Even if you never personally generate statistical results after you leave William and 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 three important purposes. First, it provides an introduction to applied statistical methods. Second, it prepares students for more advanced statistics courses. Finally, and most important, it will help you develop the habits of mind that will make you careful practitioners of statistical computing. In short, statistics is not a spectator sport, so 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, you will still gain much from the course's emphasis on communicating statistical results to non-specialists.

2. Course materials

2.1 Readings

These books are required and available at the William and Mary Bookstore.

- Susan Welch and John Comer. 2006. *Quantitative Methods for Public Administration, 3rd Edition*. ISBN 1577664930.
- Alan C. Acock. 2006. *A Gentle Introduction to Stata.* ISBN 1597180092
- Jane E. Miller. 2005. *The Chicago Guide to Writing about Multivariate Analysis.* ISBN 0226527832.

These great supplemental references are free.

- 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 the TJPPP orientation week, we will use the software program Stata in this class. I *strongly* urge you to purchase the program. It is an investment that will pay many dividends during your time at William and Mary and beyond. Recall, you can purchase the program at a discounted rate through the Stata GradPlan. Here's how:

- Surf to http://www.stata.com/order/new/edu/gradplans/gp-campus.html.
- On that page, I would recommend purchasing Stata/IC 10 with a perpetual license and the *Getting Started* manual (product code SWCSOFTGS). The price is $155.00
- Do NOT buy Small Stata 10. 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 a grade of 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" 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, 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 an opportunity for you to use your quantitative skills in an area of your choosing. 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 practice, 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 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 be embarrassed 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 instant messaging software.

During class:

- Ask questions when you do not understand something.
- Do not attend to email, instant messages, or surfing the Internet.

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 for email, Internet entertainment, instant messaging, or similar purposes 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 and 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, Cory 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, let's talk it over. Finally, I promise to treat you and your ideas with fairness and respect. I will not penalize you if you do not embrace my views; nor will I reward you if we happen to agree on political or policy matters.

5. Schedule of topics, readings, and due dates

The reading assignments repeat for some days. That is intentional because re-reading particular pages in a new context will help me to deepen old concepts and establish new ones.

5.1 Course and Stata introduction

Th 8/30	Overview • Welch and Comer, Ch. 1 and Ch. 2 (pp. 9-15) • Miller, Ch. 1 and 2 • David Cole. 2007. "Laptops vs. learning." *Washington Post*. April 7.
T 9/4	Stata basics • Acock, Ch. 1 and 4 • Optional, but encouraged: *Getting Started with Stata Release 10*, Ch. 4, 14, and 17. (This book came with your Stata software.)
Th 9/6	Using Stata to manage data • Acock, Ch. 2 and 3 • Optional, but encouraged: *Getting Started with Stata Release 10*, Ch. 10, and 12-13

5.2 Data description

T 9/11	Describing one variable with numbers • Welch and Comer, Ch. 3 (pp. 38-52) and Ch. 5 (pp. 119-129)
Th 9/13	Describing one variable with tables and figures • Welch and Comer, Ch. 5 (pp. 106-118, and example 5B on pp. 120-1) • Acock, Ch. 5 • Optional, but encouraged: *Getting Started with Stata Release 10*, Ch. 15-16
T 9/18	Basic probability rules • Moore and McCabe, *Introduction to the Practice of Statistics, 5th edition*. (pp. 259-271 and 315-319) ON BLACKBOARD

Wednesday, 9/19. HOMEWORK #1 due by 6pm

- Pay very close attention to Miller, pp. 74-5, Appendix A (pp. 407-17), and Appendix B (pp. 417-21) for this assignment, future assignments, exams, and your final paper.
- Review concepts in Miller, Ch. 1 and 2.
- Read and incorporate useful tips from Miller, Ch. 4 and 13 (pp. 301-306).

Th 9/20	Describing one variable with probability distributions • Welch and Comer, Ch. 5 (pp. 128-134)
T 9/25	Describing relationships between two variables using contingency tables • Welch and Comer, Ch. 6 (pp. 135-142)
Th 9/27	Describing relationships between two variables using scatterplots and correlation coefficients • Welch and Comer, Ch. 8 (pp. 226-227); stop before discussion of "r^2".
T 10/2	In-class exercise setup

Wednesday, 10/3. HOMEWORK #2 due by 6pm

- Review concepts in Miller, Ch. 4
- Miller, Ch. 3 (pp. 34-41) and Ch. 13 (pp. 306-7)

Th 10/4	In-class exercise execution and debrief
T 10/9	**TAKE-HOME EXAM #1 due before Washington departure (no class meeting)**
Th 10/11	No class --- TJPPP Washington Program
T 10/16	No class --- Fall Break
Th 10/18	Describing relationships between two variables using regression • Welch and Comer, Ch. 8 (pp. 212-234) • Acock, Ch. 8 (pp. 149-167). Note: You can skim the parts we've already read, and don't worry about trying to understand "statistical significance"; we'll discuss that concept later.
T 10/23	Describing relationships between two variables using regression (cont.)

5.3 Statistical inference

Th 10/25	Population, sample, and sampling distributions • Welch and Comer, Ch. 7 (pp. 167-184; stop at " . . . called a standard error of the mean." Note: pp. 181-184 is especially important.)
T 10/30	Population, sample, and sampling distributions (cont.)
Th 11/1	Confidence intervals and hypothesis testing • Welch and Comer, Ch. 7 (pp. 181-201)
T 11/6	Confidence intervals and hypothesis testing (cont.)

Wednesday, 11/7. HOMEWORK #3 due by 6pm

- Review concepts in Miller, Ch. 3 (pp. 34-41), 4, and 13 (pp. 306-7).

Th 11/8	Inference for means and differences of means • Welch and Comer, Ch. 7 (pp. 200-205) • Acock, Ch. 7 (pp. 131-141)
T 11/13	Inference for proportions • Acock, Ch. 7 (pp. 124-130)
Th 11/15	Inference for regression • Welch and Comer, Ch. 8 (pp. 212-234) • Acock, Ch. 8 (pp. 149-167)
T 11/20	Inference for contingency tables • Welch and Comer, Ch. 6 (pp. 149-151) and Ch. 7 (pp. 206-7) • Acock, Ch. 6 (pp. 102-109)

Wednesday, 11/21. HOMEWORK #4 due before you leave for Thanksgiving break

- Miller, Ch. 3 (pp. 41-49)

Th 11/22	No class --- Thanksgiving Break
T 11/27	In-class exercise setup
Th 11/29	In-class exercise execution and debrief
T 12/4	**TAKE-HOME EXAM #2 due before 12noon (no class meeting)**
Th 12/6	Introduction to multiple regression • Welch and Comer, Ch. 9 (pp. 236-249) • Acock, Ch. 10 (pp. 211-216)

Tuesday, 12/11. FINAL PAPER due by 6pm

- As noted under Homework #1, pay very close attention to Miller, pp. 74-5, Appendix A (pp. 407-17), and Appendix B (pp. 417-21).
- Miller, Ch. 2-4. Reviewing these will be essential for writing a strong paper
- Miller, Ch 5-7 and 11-12. Portions will be useful for all papers; skim for parts most relevant for your specific paper.