

## PBAF 528: Quantitative Methods II

Spring 2008

Class: T 6-8:50, Location TBA  
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Course website: <http://courses.washington.edu/pbafrgk/528/index.html>

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This course is the second in a two-course sequence aimed at helping Evans School MPA students become informed users and critical consumers of research and statistical analyses. This course introduces the application of probability, hypothesis testing, and confidence intervals to multivariate models in the context of policy and management research. By the end of this course, you will:

- Formulate answerable research questions that address complex policy questions.
- Be aware of the conditions necessary to establish causal relationships on a given outcome, emphasizing the need to disentangle the effects of multiple factors.
- Recognize the implications of research design choices, randomization, concept measurement, and good data collection for the validity and reliability of research results.
- Discriminate among data collection methods appropriate to answer a given research question, such as surveys, focus groups, key informant interviews, administrative data, or other methods.
- Select appropriate univariate, bivariate, or multivariate analytic techniques to answer a given policy or management question.
- Understand the mechanics, assumptions, and interpretation of regression models to policy or management questions, how to use regression models for both prediction and hypothesis testing, and the assumptions behind and possible "fixes" for problems with models.
- Read and analyze empirical studies
- Produce a useful multivariate empirical analysis for a non-statistician, including clear data presentation and the graphical display of data.
- Recognize how policy analysis, program evaluation, and performance measurement employ research methods and statistical techniques.
- Be exposed to nonlinear models and understand their purposes (if time permits).

### Readings and Resources

We have required texts for this course, two recommended texts, and some readings of electronic reserves for this course:

Required text:

*Econometrics 5<sup>th</sup> Edition* by A.H. Studenmund (Pearson, Addison Wesley, 2006) (Studenmund in the syllabus).

Recommended texts:

*The Basics of Social Research, Fourth Edition* by Earl Babbie (Wadsworth, 2008) (Babbie in the syllabus). This is a general guide to research, which is a useful reference for you for next year when you work on your degree project.

*Statistics 10<sup>th</sup>* by James T. McClave and Terry Sincich (Prentice Hall: Upper Saddle River, NJ, 2005). You should have this if you took PBAF 527 last quarter. M&S in the syllabus. The bookstore has stocked the 11<sup>th</sup> edition because the 10<sup>th</sup> edition went out of print as of about 2 months ago. Chapters and Sections in the syllabus refer to the 10<sup>th</sup> edition.

All are available from the University Bookstore and are on reserve in the library. Key chapters Babbie are on electronic reserve.

You will also need SPSS to complete some of the class assignments. You can get SPSS from the University Bookstore Computer Outlet. You can use the SPSS software that is available in the computer lab at the Evans school or at the Center for Social Science Computation and Research (CSSCR) (611 Condon Hall). We are using SPSS 16.0 for the course. The course website has links to SPSS help.

My **teaching notes** for the class are available on e-reserve (you can link through the course website). They represent my best guess about what I'll be teaching and how I'll be covering the topics. Flights of fancy, current events or class demand can alter them! I will depend on you to **print the notes and bring them to class** so you can participate fully in lectures, discussion, and in-class exercises.

### **Some tips:**

- Do the reading *before* you come to class. Hearing the material after having read it will help things make sense to you. I plan class exercises and lecture with the assumption that you've done the reading.
- Come with questions to class. If you do not understand something, ask questions about it in class or in the review session. Usually, you are not the only one who has the same question.
- Attend class regularly, keep up with your assignments, and frequent the weekly review sessions. If you feel like you do not understand some concept, ask in class or let me or the TA know.
- A good way of learning statistics is to discuss the material with someone else. Especially with a class that meets once a week, it is important to engage in thinking about the material in between classes. To that end, I recommend you form a study group with whom you work on problem sets. Set a time regular time to meet. Ask questions among yourselves. Seeing material from the perspectives of others and explaining it to someone else will help you better to formulate your understanding of the material. You should hand in your own work after having reviewed your responses to the problems with your group.

## Course requirements

The course requirements include five homework sets, two in-class quizzes (open books and notes), a written project proposal, a progress report, and a final project. The purpose of the two quizzes is to help diagnose your progress in learning the mechanics and interpretation of regression. The policy report allows you to consolidate your learning about regression models, apply what you are learning to a policy context, and learn to communicate your results to a nontechnical audience.

About the homework: homeworks 1-4 are graded with a check, check minus, or check plus and are meant to facilitate your learning the material. Homework 5 will be graded and is meant to allow you to apply what you've learned about statistics and multivariate models to thinking critically about actual empirical studies. The homework (with the exception of Assignment 1) will be available at the course Web site on the day noted in the course outline. Answer sheets will be handed out on the due date of each assignment, so no late homework will be accepted. If you cannot hand in the homework on time, I recommend that you complete it anyway so that you learn the material.

## Grading

Homework assignments 1-4 (complete and on time)	10%
Homework assignment 5	10%
Quiz I (April 22-open book and notes)	15%
Quiz II (May 13-open book and notes)	15%
Policy Report	<u>50%</u>
Proposal due April 24 in electronic drop box	100%
Progress report due May 13	
Final project due June 3 in class	

Date	Topic	Required Reading	Recommended Reading E = on e-reserves	Assignment
1. Tues April 1	<i>Correlation, Causality &amp; Linear Relationships</i> Bivariate Associations	Studenmund 1, 2.1, 2.4.2	M&S 2.9, 11.6 Babbie Ch 4 (esp. 95-103) <b>E</b>	Assignment 1 (handed out in class)
	<i>Regression Analysis &amp; the Research Process</i> Simple linear regression The research proposal	Studenmund 3.1, 3.3	M&S Ch 11.1, 11.2,	Policy Report Explained
2. Tues Apr 8	<i>What about other causal factors?</i> Multiple Regression Model or Experiment? Estimation, Errors, and Goodness of Fit	Studenmund 2.2-2.6;	M&S Ch 11.3, 11.4, 11.5, 11.7, 11.8 Babbie Ch 8, 12 <b>E</b>	
	<i>Interpreting Results</i> Regression Assumptions Hypothesis Testing	Studenmund 4, 5.1-5.5	M&S 12.1, 12.3	Assignment 1 Due Assignment 2
3. Tues Apr 15	<i>Interpreting Results</i> Hypothesis Testing Reprise, Prediction	Studenmund 5 (reprise, add 5.6) Babbie pp 45-56 <b>E</b>	M&S 12.2, 12.4	
	<i>The Hunt for Data and Quiz Preview</i> Data's native habitat Coding Descriptives and Other Data Issues		Babbie Ch 14 <b>E</b>	Assignment 2 Due Assignment 3
4. Tues Apr 22	<i>QUIZ I (In Class)</i>			Quiz I at Start of Class
	<i>How do we choose our model?</i> The role of theory Which independent variables? Which factors are meaningful to include? Dummy variables Does a straight line explain all relationships? Interaction Terms	Studenmund 3.1.2 (reprise) 6.1-6.6, 7	M&S 12.5, 12.6, 12.7, 12.8, 12.9 Babbie Ch 2 <b>E</b>	Report Proposal Due in Electronic Drop Box Thursday Apr 24, 5pm.
5. Tues April 29	<i>What are some problems with our model?</i>	Studenmund 8, 9, 10	M&S 12.11, 12.12	Assignment 3 Due Assignment 4
	<i>The Regression User's Guide</i> Detecting and fixing regression problems	Studenmund 11.1 See class notes		

<b>Date</b>	<b>Topic</b>	<b>Required Reading</b>	<b>Recommended Reading</b> <b>E = on e-reserves</b>	<b>Assignment</b>
6. Tues May 6	<i>What if our dependent variable is yes/no?</i> Contingency Tables Dummy dependent variables and multiple causation	Studenmund 13	M&S 13.1, 13.2 See class notes	
	<i>Policy Report Workshop and Quiz Preview</i>	Studenmund 11.2, 11.3, 11.4, 11.5, 11.6	Babbie Ch 15 <b>E</b>	Assignment 4 due Assignment 5
7. Tues May 13	<i>Quiz II (in Class)</i>			Quiz II Start of Class Progress report due
	<i>Policy Report Question and Answer Session</i> Schedule one-on-one meetings	Babbie Ch 9, Ch 10, Ch 12 <b>E</b>		
8. Tues May 20	<i>So, you want to collect data</i> Choosing the right method for the question. Pitfalls to avoid	Readings TBA Case: Public Transit and Minority Employment		
9. Tues May 27	<i>Evaluating Empirical Studies</i>			Assignment 5 Due
10. Tues June 3	<i>Presentation of Projects, Course Evaluations</i>			Final Project Due