

**PMEP 551, Introduction to Health
Econometrics**
Units: 4
Spring 2017—Monday and Wednesday 8-10am

Location: VPD 107

Instructor: Rebecca Myerson

Office: VPD Office 414E

Office Hours: Tuesday 9am-10am. **Please write me to make an appointment in advance. The 4th floor offices are difficult to access and I will need to let you in.**

Contact Info: rmyerson@healthpolicy.usc.edu. I reply to emails within 48 hours.

Course Description

This course will provide students with a basic understanding of statistical analysis and regression modeling for health economics and policy research.

The first part of the course will focus on concepts used in statistical inference, and will introduce basic principles of probability and statistics: random variables, standard distributions, and hypothesis testing. The second part of the course will provide an introduction to regression models. We will conclude the class with a discussion of causal inference, a topic that is addressed further in the following course in the sequence.

Learning Objectives

Upon completion of the course, students should be able to:

- Learn the basics of statistical analysis and regression analysis, including problems that arise when needed assumptions are violated
- Critique research studies that apply the methods discussed in class, based on the above
- Conduct statistical analyses in Stata and interpret the results

Prerequisite(s): None

Concurrent Enrollment: None

Recommended Preparation: None

Software Required: Stata

Required Readings and Supplementary Materials

- John Rice's *Mathematical Statistics and Data Analysis*. Third edition.
- Jeffrey Woolridge's *Introductory Econometrics: A Modern Approach*. 5th edition.

Optional free book: Open Intro Statistics, available online at www.openintro.org

Description of Assignments

There are two main categories of assignments:

- Problem sets will consist of questions on concepts and methods ("pencil and paper") and questions involving the application of the methods to data using Stata.
- In an additional assignment, please read one published research paper using the methods discussed in class that has either (a) has a related commentary, or (b) has been covered in the news. Write a short (1-2 page) report summarizing the paper and your critiques of either the paper itself, or the news coverage of the paper. Each student will present their article and critique in a short presentation in class.

Grading Breakdown

Assignment	Percent of Final Grade
Problem sets	20% (5% each)
Referee report and presentation	10%
Midterm	30%
Final exam	30%
Quizzes	10%

Your lowest graded homework will count for half as much as the others, and I will drop your lowest graded quiz.

Grading Scale

Course final grades will be determined using the following scale

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Assignment Submission Policy

Assignments are due at the beginning of the designated class period. Late assignments will not be accepted. I will not accept emailed assignments, hard copies only.

You may ask the instructor and other students for help on the assignments, but you must hand in your own work. Students who hand in identical (or nearly identical) assignments will receive a score of 0 for that assignment.

I have specific requirements on the formatting of Stata output for assignments. Not following these requirements will result in reduced grades. I will provide a handout detailing these requirements with the first assignment.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
	Statistics and inference		
Week 1	Probability and introduction to random variables	<ul style="list-style-type: none"> • Introduction to probability (Rice Ch. 1.1-1.4) • Conditional probability and random variables (Rice Ch. 1.5-1.7, 2.1) 	Assignment 1 posted
Week 2	Functions of continuous random variables	<ul style="list-style-type: none"> • Random variables cntd (Rice Ch. 2.2) • Functions of continuous random variables (Rice Ch. 2.3) 	
Week 3	Expected values, variance and standard deviation of random variables	<ul style="list-style-type: none"> • Expected values (Rice Ch. 4.1) • Variance and standard deviation (Rice Ch. 4.2) • Also read Rice Ch. 10, pp. 377 – 380, 389 – 397 	Assignment 1 due; Assignment 2 posted
Week 4	Covariance and correlation; conditional expectation and prediction	<ul style="list-style-type: none"> • Joint and conditional distributions (Rice Ch. 3.1-3.2, 3.5 p. 87-88 only) • Covariance and correlation (Rice Ch. 4.3) • Conditional expectation and prediction (Rice Ch. 4.4) 	
Week 5	Law of large numbers and central limit theorem; intro to sampling	<ul style="list-style-type: none"> • Normal distributions (Rice Ch 2.2.3) • Limit theorems (Rice Ch. 5.1-5.3) • Survey sampling; confidence intervals (Rice Ch. 7.1-7.3) 	Assignment 2 due
Week 6	Confidence intervals, sampling continued, parameters	<ul style="list-style-type: none"> • Stratified and cluster randomized sampling (Rice Ch.7.5-7.6) • Parameter estimation (Rice Ch. 8.1-8.3, 8.5) 	
Week 7	Hypothesis testing	<ul style="list-style-type: none"> • Rice Ch. 9.1-9.3 	
Week 8	Review and midterm		Midterm
	Introduction to Regression		
Week 9	Bivariate linear regression	Rice Ch. 14.1-14.2 and/or Wooldridge Ch. 2	Assignment 3 posted
Week 10	Multivariate linear regression	<ul style="list-style-type: none"> • Estimation (Wooldridge Ch. 3) 	
Week	Inference	<ul style="list-style-type: none"> • Inference (Wooldridge Ch. 4) 	Assignment 3 due;

11		<ul style="list-style-type: none"> Asymptotic inference (Wooldridge Ch. 5) 	Assignment 4 posted
Week 12	Specification issues	<ul style="list-style-type: none"> Functional form (Wooldridge Ch. 6) Dummy variables (Wooldridge Ch. 7) 	
Week 13	Heteroskedasticity/ non-spherical disturbances	<ul style="list-style-type: none"> Non-spherical disturbances and OLS (Wooldridge Ch. 8.2) 	Assignment 4 due
Week 14		<ul style="list-style-type: none"> Generalized least squares (Wooldridge Ch. 8.3) Heteroskedasticity (Wooldridge Ch. 8.4-8.5) 	
Week 15	<ul style="list-style-type: none"> Thinking about causality: Introduction to the Roy model Final review <p>(no additional readings)</p>		
FINAL			Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at www.usc.edu/soc .

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/student/scampus/part-b>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university. You are encouraged to report all incidents to the *Office of Equity and Diversity/Title IX Office* <http://equity.usc.edu> and/or to the *Department of Public Safety* <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* <http://dsp.usc.edu> provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.