

POEC 253: Empirical Methods in Political Economy
Fall 2017
MR 1:10-2:25, Schow Library Classroom 030B

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Office hours: Tuesday 11:30-1:00, Wednesday 10:30-noon, and by appointment

Course objectives:

This course provides an introduction to common empirical tools used in policy analysis and implementation. The broad aim is to train you to be a discriminating consumer of public policy-relevant research. The emphasis in the course is on intuitive understanding of the central concepts. Through hands-on work with data and critical assessment of existing empirical social scientific research, you will develop the ability to choose and employ the appropriate tool for a particular research problem, and to understand the limitations of the techniques. No prior experience with statistics is assumed or needed.

Topics to be covered include basic principles of probability; random variables and distributions; statistical estimation, inference and hypothesis testing; and modeling using multiple regression, with a particular focus on understanding whether and how relationships between variables can be determined to be causal—an essential requirement for effective policy formulation. Throughout the course, the focus will be on public policy applications relevant to the fields of political science, sociology, and public health, as well as to economics. Example applications include: health screening tests, income distribution and income inequality, the effects of resources on standardized test scores, impacts of gun control legislation on crime, the effect of education on labor market outcomes, and institutions and economic development.

The course has four sections: 1) an introduction to probability; 2) basic statistical methods; 3) the multiple regression model; and 4) advanced topics in the multiple regression model. Probability is the study of the mathematical structure of events whose outcome cannot be known with certainty on the basis of initial information. Statistics uses probability to infer the characteristics of a population when the available data render certainty about those characteristics impossible. Econometrics is a sister discipline of statistics that provides methods for both describing multivariate relationships and establishing causal inference. Econometrics provides the tools that make the practical application of economics possible but its importance is not limited to economics, as the tools you will learn are also widely used outside of economics, in fields ranging from public policy, public health, sociology and psychology to marketing and finance.

Note: This course satisfies the statistical methods requirement for the major in Political Economy. It does not satisfy the econometrics requirement for the major in Economics.

Attendance and class participation:

It is extremely important to note that in a statistical methods course such as this, learning is cumulative. Each topic builds on the previous one. You must be regular in attending class and in submitting assignments. Because there are externalities (on other students as well as on me) when you miss class, attendance policy in this course is strict. With the exception of the optional review sessions held before each exam, you are expected to attend class and to participate in class. While I realize that circumstances (family emergency, acute illness) may arise that require you to miss class, you should inform me prior to the class if at all possible in the event that such circumstances do arise so that we can make alternative arrangements for you to cover the material. Attendance will be recorded at each class. Your class participation grade will reflect your attendance, the extent to which you contribute to our class discussion, occasional in-class problems that you will turn in, and possibly unannounced short quizzes. In addition, if you miss three or more classes, the “exam improvement policy” described below does not apply.

Course reading and computer resources:

The (required) text is James H. Stock and Mark W. Watson, *Introduction to Econometrics, 3rd ed. Updated*, Pearson Education, 2014. You may use the regular 3rd edition instead of the updated 3rd edition; the text itself is identical, and the only differences between them are in the empirical results, which are based on updated data in the updated edition, and a few of the problem set problems. If you use the regular 3rd edition you are responsible for making sure you are doing the correct problems. This text will be supplemented with additional material on probability and statistics available in a reading packet and on Glow and with articles that I will hand out and make available on Glow throughout the semester.

We will be using the statistical package Stata and, for producing some graphs, Excel. Stata is available in both PC and Mac versions, and should be installed on all lab computers. In addition, it is keyserved software, so you can use it on your own computer as long as your computer is connected to the campus network. It can be downloaded from the OIT webpage (choose the version of Stata SE 14 corresponding to the operating system you are using). **You must install the keyserver application KeyAccess first** (also downloadable from the OIT webpage). If you have any difficulty installing Stata on your computer, the student help desk at x3088 should be able to help you.

Any class handouts, all problem sets, and datasets to be used in the course will be posted on Glow. You can expect that materials will be posted by the end of the day on which the hard copy version was handed out. Please let me know if you have any difficulty finding or accessing any of the materials.

Grading:

Grades will be based on seven problem sets (the best six of which count towards your grade), two group empirical projects, two midterms, a final exam, and class participation. Your overall grade will be determined according to the following scheme:

Problem sets	15%	Empirical projects	20%
Class participation	15%	Midterm 1	15%
Midterm 2	15%	Final exam	20%

Exam improvement policy:

To reward improvement, if your final exam grade is higher than either of your midterm grades, the weight on your lowest midterm grade will be reduced to 10% and the weight on the final will be increased to 25%. If you miss three or more classes, this policy does not apply.

Problem sets:

The problem sets are an important part of the course, as data analysis and econometrics require practice to master. In order for you to develop proficiency in data analysis, most problem sets will include empirical exercises to be done using the computer. Group collaboration on the problem sets is encouraged, however each student must hand in his or her own problem set, written in his or her own words. It is essential that you understand the problem yourself, and have not just relied on the understanding of others. *Turning in a problem set answer that is identical to or even essentially the same as another student's problem set is a violation of the honor code.* Problem sets are due in class according to the schedule of due dates given below. Problem sets will be graded on a plus, check-plus, check, check-minus scale. The lowest problem set grade will not be used in determining your overall grade. *Late problem sets will not be accepted.*

Group projects:

There will be two group empirical projects, one in the first half of the semester and one in the second half. The group projects are similar to the problem sets in involving analysis of data, but they are more open-ended. Each group will write a short paper describing its analysis, results, and conclusions and will present the results in class. *Late papers will drop a grade step per 24 hours late. For example, an A paper drops to an A- if turned in during the first 24 hours after the paper is due; after 24 hours late the A- drops to a B+, etc.*

Classroom etiquette:

I have great respect for Williams students and I expect you to show respect for each other. Acting with respect in a classroom setting requires: coming to class on time, not using cell phones for any reason at any time, including for sending or receiving texts, not using a laptop or tablet for anything other than the in-class computer exercises or taking notes, not holding "side conversations," and refraining from exiting and re-entering the room excessively. At the same time, questions and discussion are crucial for learning, so please don't be shy about speaking up in class. If you have a question or are unsure about something, please ask me rather than your neighbor, as others are likely to have the same question and will benefit from hearing the answer.

Academic honesty:

The Honor Code applies to all work submitted and quizzes and exams taken in this class. You are encouraged to collaborate on the problem sets, though you must turn in your own problem set, written in your own words. You are required to collaborate on the group projects, and will turn in one project per group. Several in-class exercises will also be conducted in groups. You may also collaborate in studying or preparing for the exams, but the written exams should be your work alone. Appropriate attribution of any source material used for the group projects is essential. Either footnotes or in-text citations with a references page (not counted as part of the page limit) are acceptable. Pay particular attention to citations of online sources—I must be able to find the source from the location you provide.

Statement of student workload:

In addition to the 2 ½ hours in class, you should expect to spend (on average) *at least* 10 hours per week outside of class on work for the course. If you find that you are spending considerably more (or considerably less!) time to engage with this course academically, please contact me so that we can determine the best course of action as you approach the materials.

Succeeding in Poec 253:

Learning statistics and econometrics is a cumulative experience. This course also moves through material quickly. *For best results, work steadily on this class—an hour a day is far more effective than several hours of cramming before an assignment or exam.* It is essential that you not fall behind, so if there is something you do not understand or are having difficulty with, do not wait to get help! There are four places to turn for help:

- 1) Your classmates. They are a great resource. Study together, ask each other questions, and work with each other on problem sets. Classmates with a good understanding of a topic will benefit from assisting others, so do not be shy about asking to work with others.
- 2) Me. I have weekly office hours (listed on the first page) or you can make an appointment if my office hours conflict with your schedule. You may also e-mail questions to me anytime, and I will do my best to respond within 24 hours. However, do not wait until the last minute to ask for help.
- 3) The TA is Heidi Halvorsen (hph1@williams.edu). She will hold review sessions each week at a time and place to be determined.
- 4) If you are struggling and you feel like you need more one-on-one help, then it is possible to get a peer tutor (at no cost to you). Talk to me if you feel you would like to explore this option.

Accommodations:

I am committed to supporting the learning of all students in my classes. If you have already registered with G. L. Wallace, the Director of Accessible Education, and have a letter of accommodations, please meet with me early in the course to discuss, plan, and implement your accommodations in the course. If you have or think you have a disability (learning, sensory, physical, chronic health, mental health or attentional), please contact G. L. Wallace (202 Paresky, (413) 597-4672). If you are experiencing mental or physical health challenges that are significantly affecting your academic work or well-being, please contact the Dean's Office for support, and ask to have them get in touch with your instructors.

Course topics and textbook reading list:

(“SW” indicates reading from the Stock and Watson text, “RP” indicates reading in the packet.)

<u>Class</u>	<u>Date</u>	<u>Topic and reading</u>
1.	Thursday 7 Sept.	Introduction and overview SW: Chapter 1

Probability, Random Variables, and Distributions

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| 2. | Monday 11 Sept. | Probability
RP: Mansfield, Edwin. <i>Statistics for Business and Economics</i> , 5 th ed. New York: W. W. Norton, 1994, pp. 83-115. |
| 3. | Thursday 14 Sept. | Random variables and probability distributions
RP: Mansfield, Edwin. <i>Basic Statistics with Applications</i> . New York: W. W. Norton, 1986, pp. 129-147.
<i>Problem set 1 due</i> |
| 4. | Monday 18 Sept. | Random variables and probability distributions, continued
Re-read the first two readings. |
| 5. | Thursday 21 Sept. | Features of probability distributions
SW: Chapter 2.1-2.4
<i>Problem set 2 due</i> |
| 6. | Monday 25 Sept. | The normal distribution and the central limit theorem
SW: Chapter 2.5-2.6
RP: Beals, Ralph. <i>Statistics for Economists: An Introduction</i> . Chicago: Rand McNally & Company, 1972, pp. 110-134. |

Statistical Estimation and Inference

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| 7. | Thursday 28 Sept. | Statistical inference: point and interval estimation
SW: Chapter 3.1-3.3
<i>Problem set 3 due</i> |
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Meet with me in groups between 9/27 and 10/4 to discuss first group project

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| 8. | Monday 2 Oct. | Testing hypotheses
SW: Chapter 3.4-3.6 |
| 9. | Thursday 5 Oct. | <i>Midterm I (covers material through 28 Sept.)</i> |

Monday 9 Oct. No class—Reading Period

10. Thursday 12 Oct. Examining relationships between variables: covariance, correlation, and regression
SW: Chapter 3.7, 4

11. Monday 16 Oct. Group presentations
Group project 1 due

Linear Regression

12. Thursday 19 Oct. Hypothesis testing in the two-variable model
SW: Chapter 5.1-5.4

13. Monday 23 Oct. Multiple regression, omitted variables bias, and causality
SW: Chapter 6

14. Thursday 26 Oct. Hypothesis testing in multiple regression
SW: Chapter 7
Problem set 4 due

15. Monday 30 Oct. Regression specification: nonlinear functions of variables
SW: Chapter 8.1-8.4

16. Thursday 2 Nov. Regression specification, continued: interactions
Re-read SW Chapter 8.1-8.4
Problem set 5 due

17. Monday 6 Nov. Assessing regression based studies
SW: Chapter 9

Regression: Beyond the Basics

18. Thursday 9 Nov. An application of dummy variables: simple panel data methods
SW: Chapter 10
Problem set 6 due

19. Monday 13 Nov. More on panel data; Regression with a binary dependent variable
SW: Chapter 11.1-11.2

20. Thursday 16 Nov. *Midterm II*

21. Monday 20 Nov. Instrumental variables
SW: Chapter 12

Thursday 23 Nov. No class—Happy Thanksgiving!

- 22. Monday 27 Nov. Instrumental variables, experiments, and quasi-experiments
SW: Chapter 13
- 23. Thursday 30 Nov. Introduction to time series regression
SW: Chapter 14
Glow: Prof. Ken Kuttner notes
Problem set 7 due
- 24. Monday 4 Dec. More on time series
Re-read SW Chapter 14 and Kuttner notes
- 25. Thursday 7 Dec. Group presentations
Group project 2 due

Final Exam (scheduled during final exam period)