

PUAD 602 – Quantitative Methods for Policy Analysis II
Course Syllabus
Spring 2012

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Office hours: By appointment
Class meetings: Tuesday section: 2:35-5:15 p.m. (Ward 201)
Wednesday section: 5:30-8:00 p.m. (Ward 304)

Course Overview

This course is the second in a three-course sequence that covers the quantitative methods used in public policy research. It is designed to give you the tools necessary to evaluate complex policy problems and interventions. We will spend most of our time learning about Ordinary Least Squares (OLS) regression, a versatile and essential tool in the policy researcher's toolbox.

Although much of the content is somewhat technical, we will focus as much as possible on understanding how to *apply* the concepts to practical policy research. Toward that end, we will spend part of each class session in the computer lab, working in small groups on exercises that will help you to become more familiar with Stata. Experience with Stata is not a formal prerequisite for the course, but students who exempted out of PUAD 601 should plan to spend additional time outside class catching up on how to use the software.

Materials

Studenmund, A. H. (2010). *Using Econometrics: A Practical Guide* (6th Ed.). ISBN: 9780131367739.
A jump drive for saving data sets and do-files for Stata work
A basic calculator
A personal copy of Stata/IC or Stata/SE (Version 12)¹ – *not required but highly recommended*

Course Policies

Academic Integrity

I will strictly enforce AU guidelines on academic integrity, which are explained in detail at <http://www.american.edu/academics/integrity/code.htm>. You are welcome to collaborate on homework assignments, but anything that you submit for credit should be in your own writing, and you are not allowed to work together on tests. Make sure that you appropriately cite materials used in your memo. *I will pursue the maximum sanction in all cases of academic dishonesty.*

Accommodation and Academic Support

Please let me know as soon as possible if you require accommodation for physical or learning disabilities. The following offices can also assist you with needs in this area:

- Academic Support Center (<http://www.american.edu/ocl/asc/index.cfm>)
- Counseling Center (<http://www.american.edu/ocl/counseling/index.cfm>)
- Disability Support Services (<http://www.american.edu/ocl/dss/index.cfm>)

¹ Visit <http://www.stata.com/order/new/edu/gradplans/gp-campus.html> for information on discounts.

Assignments and Due Dates

All assignments are due at the *beginning* of the class session for which they are assigned. *I do not accept late assignments.* If you are absent from class, it is still your responsibility to turn in the homework electronically or through another student. The same holds for the policy memo, which is due in class on **April 24/25**.

Please remember that all assignments are professional work products. They should be typed and free of spelling and grammar errors. For assignments that involve calculations, you should type up your answers, but you can submit calculations in handwritten form on another sheet of paper. Please submit all assignments in hard copy, stapled.

Communication

I use Blackboard to post announcements, grades, and course materials, and I use email to communicate with individual students. I will use your AU email address. Please check it regularly or forward it to another account that you monitor frequently.

Make-Up Tests and Incompletes

I do not typically allow students to make up exams or earn a grade of Incomplete. Please attend class on days when exams are administered. If you are unable to do so, you may petition to take a make-up test, but this is granted only in exceptional circumstances. I may require documentation before giving a make-up test, and I may also choose to impose a grade penalty. Please let me know as soon as you see a problem developing so that we can consider the best means of addressing it. I am unlikely to allow a make-up test if you do not get in touch with me prior to the date of the test.

Writing Assistance

I have *very* high expectations for written work. You are responsible for producing assignments that are clear, well-organized, and free of grammatical errors. I encourage students who struggle with writing to make an appointment with the AU Writing Center, particularly for the policy memo. More information is available at <http://www.american.edu/cas/writing/>.

Evaluation

I use the following grading system (*note*: I do *not* round decimals up to the next point):

| <u>Numeric Grade</u> | <u>Letter</u> | <u>Assessment</u> |
|----------------------|---------------|--|
| 95 - 100 | A | Exceeds my expectations for good MPP/MPA student work |
| 90 - 94.99 | A- | |
| 88 - 89.99 | B+ | Meets my expectations for good MPP/MPA student work |
| 83 - 87.99 | B | |
| 80 - 82.99 | B- | Shows substantial deficiencies; minimally meets expectations |
| 78 - 79.99 | C+ | |
| 73 - 77.99 | C | Work fails to meet minimum requirements and expectations |
| 70 - 72.99 | C- | |
| < 70 | D/F | |

Assignments

| | |
|-------------------------------------|-----|
| Homework assignments (10 @ 2% each) | 20% |
| Stata lab exercises | 5% |
| Policy memorandum | 25% |
| Exams (2 @ 25% each) | 50% |

Homework Assignments

I distribute homework assignments in class the week before they are due. You should bring completed assignments to class the following week in hard copy. I evaluate homework with a grade of “check” (full credit) or “check minus” (½ credit).

You will earn a “check” as long as you turn in a professional product and make a good faith effort to produce correct answers. I do not penalize you for incorrect answers, as long as it is clear to me that you have read the relevant chapter and put sufficient time into working through the assignment. You will receive a “check minus” if the assignment is incomplete or you have made egregious mistakes that reflect an obvious lack of effort. You will not receive credit at all if your work is handwritten or has not been proofread.

Stata Lab Exercises

We will spend the second half of each class session in the SPA computer lab, where we will use Stata software to apply the methods we learn to real-world data. You will have exercises to complete in groups of 2-3 students. These will collectively count for 5% of the course grade, and I will evaluate them using the same system that I use for homework (check/check minus). All lab exercises must be completed in class; you cannot make them up or do them at home for credit.

Policy Memorandum

You will write a memo that investigates an empirical research question in public policy that is of interest to you. *I encourage you to continue working with the same topic and data set used in your PUAD 601 policy memo.* The policy memo will count for 25% of the final course grade and will be due in class on **April 24/25**. Details about the memo follow the syllabus in the appendix.

Exams

There will be exams on **March 6/7** and **May 1/2**. Each exam will count for 25% of the course grade and take one class session to complete. The final exam is not cumulative, but it will incidentally incorporate some topics from the first half of the semester. Both exams are closed-book/closed-note.

Class Format

Class will involve a combination of lecture, discussion, and group work. At the beginning of each class, I will distribute a set of study questions and terms that you should understand by the end of the session. We will take a 10-15 minute break at some point in the middle of class.

I call on students by name to answer questions during lecture and discussion. It is important for you to follow along as we work through calculations, since I will call on you to help me figure out the correct answer. I also frequently ask students to explain the logic behind some of the concepts that we discuss, and when we go over completed homework assignments, I ask students to explain their answers to the class.

I understand that being called upon to answer questions can create some anxiety, but there are three pedagogical reasons behind this format. First, many of you rarely speak in class but have interesting and relevant insights that would benefit others. Calling on you directly allows everyone to hear what you have to say and leads to more diversity in the perspectives that we consider as a class. Second, effective public speaking is a *bona fide occupational requirement* for those in policy analysis and management positions. You should consider this class a low-risk environment for working on your speaking skills and becoming more comfortable speaking in front of others. Third, the risk of being called upon to answer questions provides an incentive for everyone to put adequate preparation into the homework assignments and readings.

If you have social anxiety issues that make this arrangement particularly daunting, please let me know. In my experience, students are anxious about this at first but get much more relaxed after a few class sessions.

Almost all class sessions will be split between a classroom and computer lab. Some of our sessions will require you to use Stata software in small groups. I try not to move too quickly through problems and examples, but please speak up if you fall behind or need Stata help. By the same token, please be patient with your classmates when they need more help than you do figuring out the software.

Schedule of Classes

Please note that this is a *tentative* schedule. Depending on student needs, it is possible that readings and dates may have to be modified. I will try my best to keep such modifications at a minimum.

| Date | Topic | Reading | Assignment |
|----------------|---|--|---------------|
| Jan. 17/18 | Review of regression fundamentals | Studenmund, 1 (all) | --- |
| Jan. 24/25 | Mechanics of OLS regression | Studenmund, 2 (all) | Homework #1 |
| Jan. 31/Feb. 1 | Hypothesis testing in OLS regression | Studenmund, 5 (all) | Homework #2 |
| Feb. 7/8 | Dummy variables and interaction terms | Studenmund, 7.4 and 7.5 | Homework #3 |
| Feb. 14/15 | Dummy variables and interaction terms (continued) | Studenmund, 7.4 and 7.5 | Homework #4 |
| Feb. 21/22 | Classical regression assumptions | Studenmund, 4 (all) | Homework #5 |
| Feb. 28/29 | Review for midterm exam | --- | Memo proposal |
| Mar. 6/7 | Midterm exam | | |
| Mar. 13/14 | No class – Spring Break | | |
| Mar. 21/22 | Model specification | Studenmund, 6 (all) | Homework #6 |
| Mar. 28/29 | Functional form | Studenmund, 7.2 | Homework #7 |
| Apr. 3/4 | Multicollinearity | Studenmund, 8 (all) | Homework #8 |
| Apr. 10/11 | Heteroskedasticity and autocorrelation | Studenmund, 9.1, 9.2, 10.1, 10.2, and 10.4 | Homework #9 |
| Apr. 17/18 | Overview of panel data methods | Studenmund, 16.2, 16.3, and 16.4 | Homework #10 |
| Apr. 24/25 | Review for final exam | -- | Policy memo |
| May 1/2 | Final exam | | |

Appendix: Policy Memorandum Guidelines

Pedagogical Purpose

The policy memo will give you an opportunity to apply course concepts to a real-world policy problem. The idea is that you will better understand the applications and limitations of multivariate regression analysis if you use it in your own research. This project also gives you an opportunity to delve into a policy problem in which you have particular interest.

**I strongly recommend* that you read Studenmund's Chapter 11, "The Regression User's Handbook" as you work on your policy memo.

Topic

You can choose any topic that one of the course data sets can be used to investigate, as long as it meets the following criteria:

- You can formulate four testable hypotheses, all with a basis in existing research
- You can use multiple regression as your primary method of analysis
- Your dependent variable is measured at the interval/ratio level

Most students start with a phenomenon that they want to explain or predict (e.g., student performance in school, employee job satisfaction, household income), and then formulate the project around the primary factors that are expected to influence it. We can talk one on one during the semester if you would like help in defining your topic.

Due Dates

You should submit a one-page single-spaced proposal for the policy memorandum on **February 28/29**. It should include a proposed paper title; a short description of the policy problem; a short description of the data set that you will use; a list of the variables that you plan to use, including both dependent and independent variables; and a list of five potential sources for the review of literature. *Any student who does not turn in a complete proposal will be penalized one letter grade on the research paper.*

The memorandum itself should be submitted in hard copy on **April 24/25**.

Formatting

The memo should be typed, single-spaced, using a font that is easy to read. Borders should be approximately 1" and typeface should be no smaller than 10 pt. and no larger than 12 pt. (except for headings, which can be larger). Students are *strongly* encouraged to use headings and bullets where appropriate in order to improve the readability of their paper. **Under no circumstances can the entire length of the memo exceed 10 pages.** The 10-page limit includes all references, graphics, title pages, etc.

Figures and Tables

Students should label all figures and tables. Figures include any charts, graphs, or other visual representations of data. Figures and tables should be numbered sequentially according to where they are referenced in the text of the memo. Numbering for figures should be independent of numbering for tables (i.e., there will be both a Figure 1 and Table 1). *All figures and tables should appear in the text at a point where they are helpful.*

Students should *not* cut and paste Stata figures and tables into their report unless they have “cleaned up” the variable names to be reader-friendly. We will discuss this in more detail in class, but the bottom line is that your tables should resemble those found in professional journals and reports. A layperson should be able to understand the table without being familiar with your particular data set.

References

Students should reference materials in their paper with footnotes, endnotes, or parenthetical citation. I do not require a particular style, but please be consistent in the style that you choose. I recommend the *Publication Manual of the American Psychological Association* or *The Chicago Manual of Style*, both available in the AU library. You are required to adhere to the AU Academic Integrity Code, so make sure that you do not accidentally fail to cite a key source.

Organization

The policy memo should include the following components, labeled as individual sections:

1. Introduction to the Policy Problem (approximately ½ page)

This section introduces the reader to your topic and motivates him or her to continuing reading. Explain why your topic is important and outline how your memo is organized.

2. Existing Research (approximately 2 pages)

This section reviews current research on your policy problem. This should expand upon your introduction by explaining to the reader what we know about the policy problem. It should also lay the foundation for the hypotheses that you test in your memo. This section should include at least *ten* credible sources (e.g., journals, books). *Under no circumstances should you ever cite Wikipedia or similar websites in an academic or professional report.*

3. Hypotheses (approximately ½ page)

This section states the hypotheses that you will test in your report. You are required to test at least *four* hypotheses, and they should be numbered sequentially. After each one, describe what you are testing in a sentence or two.

4. Data (1 short paragraph)

This section describes the data set that you use to test your hypotheses. You should include the following details, insofar as they are available/relevant:

- a. The unit of analysis (e.g., state, country, student)
- b. Number of observations
- c. Year of observation
- d. Source from which the data are drawn

5. Variables (1-2 pages)

This section explains the variables in the data set that you will use to examine your policy problem. You do not need to explain all of the variables in the data set – only those that you will use in conjunction with the hypotheses you developed above. The number of variables will vary by student and topic, but I foresee a *bare minimum* of 6-8 variables (and this will likely be higher for many topics).

Remember that your dependent variable(s) must be interval/ratio. Regression for categorical dependent variables requires a set of tools that we will not cover. This section should include the following details:

- a. The name of each variable and a description of how it is measured
- b. Brief interpretation of relevant descriptive statistics for each variable (typically the mean, standard deviation, and range)
- c. Any methodological limitations for each variable
- d. A table of descriptive statistics that includes all variables and their means, standard deviations, and ranges

6. Method (1-2 pages)

This section briefly describes the method that you used to test the hypotheses formulated above (you must use OLS regression). After *briefly* describing the method, you will describe your efforts to test (and correct for) violations to the model. You should make sure that you address the following potential violations: endogeneity, specification, functional form, serial correlation, collinearity, and heteroskedasticity. You should be sure to include appropriate tables and graphs that are formatted cleanly and easy to read.

7. Results (approximately 2 pages)

This section describes the results of your analysis. You should describe the results of your regression analysis, starting with the coefficient of determination and overall significance of the model. You should then describe the results of the hypothesis tests for each of the independent variables, describing both substantive and statistical significance for each. *Explicitly* state whether you reject your hypothesis in each case, and include a table of regression results (we will discuss how to present results in class).

8. Conclusions (approximately ½ page)

This section draws conclusions from the data analysis section above. You should make sure to address the following questions briefly:

- a. What are the policy implications?
- b. What methodological caveats are necessary?
- c. How can future research improve upon your work?