Research Design and Methods for Public Policy I

Fall 2019

Instructors:			Office Hours:
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Course Description

This course will introduce students to common quantitative research design and methods used for public policy analysis. Students will learn how to formulate practical research questions, find and construct appropriate datasets used for policy analysis, and use a variety of statistical tools to provide insight to important policy issues. Students will also learn how to use statistical software to manage and analyze various types of data. No prior knowledge of statistics is needed.

Learning Outcomes

By the end of the course students should be proficient in:
- ✓ Identifying and generating answerable research questions with direct policy implications
- ✓ Using Stata to construct datasets and produce basic descriptive statistics
- ✓ Using appropriate statistical analyses to answer specific research questions
- ✓ Critically appraising quantitative research findings, and
- ✓ Presenting analyses in a professional manner that is accessible to policy-makers.

Assessment

Grades will have two components:

(1) Homework sets (50%): Homework will focus on practicing quantitative techniques learned in class. There will be 5 homework sets each worth 10%. Deadlines and topics will be the following:
   a. Homework 1 (descriptive stats), due 27 September 5pm
   b. Homework 2 (probability and hypothesis testing), due 11 October 5pm
   c. Homework 3 (T-test, anova), due 25 October 5pm

      d. Homework 4 (Regression & Correlation) due 8 November 5pm
      e. Homework 5 (Multiple regression) due 29 November 5pm
(2) Bi-weekly quizzes (50%): Quizzes will be short, about 15 mins, multiple-choice tests of key concepts learnt in the previous classes. There will be 5 quizzes each worth 10%, dates are in the detailed syllabus below.

PLEASE NOTE: Due to the large size of the class, there will be NO extensions granted for any of the homework sets. If you are ill and can provide medical documentation, the grade for the assessment missed will be incorporated into the weighting for the research paper.

Course Readings

Mandatory

1. *Essentials of Statistics for Business and Economics* (2015) by Anderson, Sweeney, Williams, Camm and Cochran (ASWCC).
2. *A Handbook of Statistical Analyses using Stata* (2004) by Sophia Rabe-Hesketh & Brian Everitt. Third Edition. CRC Press, London.

Note: Students are welcome to purchase earlier editions of the above book, but must note that the material may differ slightly from what is presented in class.

Optional

Students, particularly those without a strong background in statistics or econometrics, are strongly encouraged to read the following:

1. *Naked Statistics: Stripping the Dread from the Data* (2014) by Charles Wheelan.
   An introduction to statistics with lots of intuition and examples. An easy-to-understand book that helps the reader learn how research questions are formulated and answered.
3. *Statistics Unplugged, 4th edition* (2013) by Sally Caldwell.
   A great companion to ASWCC for students who prefer more intuition.
4. *Introductory Econometrics: A modern approach, 6th edition* (2015) by Jeffery M. Wooldridge.
   An excellent resource for those who want more detail on regression analysis. One of the books that an empirical researcher or policy-maker should have on hand at all times.
5. *Mastering 'Metrics: The Path from Cause to Effect* (2014) by Joshua Angrist and Jörn-Steffen Pischke.
   Angrist and Pischke are infamous for their econometrics books that put intuition and causal analysis front and center. Loaded with real-world examples to highlight the concepts presented, this book is aimed at students with some knowledge of math and statistics.

Schedule

Please note that this schedule is approximate and is subject to change.

Some advice: Your success in this course will depend on keeping up with the material as it is presented. We strongly urge you not to fall behind because the material in the course is intensely cumulative. You will also benefit much more from the lectures if you read the assigned material before the class sessions.

No.	Date	Instr.	Topic
1	17-18 Sept	MF	**Introduction** Introduction to the course (why quants methods, aims, structure, etc); basics of research design such as theories, variables and operationalization, hypotheses; quantitative vs. qualitative research; types of data. Introduction to Stata Readings: ASWCC Ch. 1 Rogoff-Reinhart scandal: summary: http://www.bbc.co.uk/news/magazine-22223190 Sophia Rabe-Hesketh & Brian Everitt (2004) A Handbook of Statistical Analyses using Stata. Third Edition. CRC Press, London. Chapter 1.
2	24-25 Sept	MF	**Data Collection, Measurement and Descriptive Statistics** Surveying, sample vs. population; measurement error, measures of central tendency; measures of dispersion; describing distributions, widely used visualizations. Introduction to Stata. Readings: ASWCC Ch. 2 & 3 Sophia Rabe-Hesketh & Brian Everitt (2004) A Handbook of Statistical Analyses using Stata. Third Edition. CRC Press, London. Chapter 2.
3	1-2 Oct	CB	**Introduction to Probability Distributions** Basic probability, normal distribution, sampling distributions Quiz 1 Readings: ASWCC Ch.4, Ch. 6-8 Brown, C., Ravallion, M., and van de Walle, D. (2018). Most of Africa's Nutritionally Deprived Women and Children are Not Found in Poor Households. *Review of Economics and Statistics*, forthcoming.
4	8-9 Oct	CB	**Hypothesis Testing** Null vs. alternate hypotheses, type I vs. type II tests, one vs. two tailed tests. Readings: ASWCC Ch.9 Donohue, J. J., and Levitt, S. D. (2001). The Impact of Legalized Abortion on Crime. *Quarterly Journal of Economics* 116(2): 379–420.
5	15-16 Oct	CB	**Comparison with Means and ANOVA** Comparisons of group means, one and two sample t-tests with equal and unequal variance; analysis of variance (ANOVA) Quiz 2 Readings: ASWCC Ch.10 Fearon, J. D., and Laitin, D. D. (2003). Ethnicity, Insurgency, and Civil War. *American Political Science Review* 97(1): 75-90.
6	22-23 Oct		**Reading week – no class**
7	29-30 Oct	MF	**Introduction to Regression and Correlation** Correlation; simple regression model; model assumptions; significance testing. Implementation in Stata & replicating a research paper. Quiz 3 Readings: ASWCC Ch. 12 Nicholas Charron, Carl Dahlström, Mihály Fazekas, and Victor Lapuente, (2017), Careers, Connections and Corruption Risks In Europe. Journal of Politics, 79(1). 89-104. Data&do files: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/CSHNIS

8	5-6 Nov	TA	**Multiple Regression Basics** Multiple regression mode; interpreting coefficients; significance testing. Implementation in Stata & replicating a research paper. Readings: ASWCC Ch. 13 Nicholas Charron, Carl Dahlström, Mihály Fazekas, and Victor Lapuente, (2017), Careers, Connections and Corruption Risks In Europe. Journal of Politics, 79(1). 89-104. Data&do files: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/CSHNIS
9	12-13 Nov	MF	**Further Issues with Multiple Regression** Functional form: using logs, quadratics, interaction terms; goodness of fit: r-squared, adjusted r-squared; predictions. Implementation in Stata & replicating a research paper. Quiz 4 Readings: Wooldridge Ch. 6 and Ch.7 (notes to be provided) Nicholas Charron, Carl Dahlström, Mihály Fazekas, and Victor Lapuente, (2017), Careers, Connections and Corruption Risks In Europe. Journal of Politics, 79(1). 89-104. Data&do files: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/CSHNIS
10	19-20 Nov	MF	**Inference with Multiple Regression** Using proxy variables; measurement error: dependent and independent variables, missing data, nonrandom samples, outliers. Implementation in Stata. Readings: Wooldridge Ch. 9 (notes to be provided)
11	26-27 Nov	MF	**Visual arguments** Principles of good data visualization, data visualization practice using Tableau Readings: Edward Tufte (2001) The Visual Display of Quantitative Information. 2nd edition, Graphics Press. Chapter 2. Tableau introductory video (1. Tableau Public Overview): https://public.tableau.com/en-us/s/resources Bring your favorite graph for discussion in class!
12	3-4 Dec	MF	**Composite indicators, reflections on the world of quantitative analysis/statistics/data science** Composite score conceptualisation, imputation of missing data, weights, Principal Component Analysis. Implementation in Stata. Taster of what else lies on in this domain Quiz 5 Readings: OECD (2008) Handbook on Constructing Composite Indicators, OECD, Paris, ch. 1. Sophia Rabe-Hesketh & Brian Everitt (2004) A Handbook of Statistical Analyses using Stata. Third Edition. CRC Press, London. Chapter 14.

Grading

CEU uses a system of letter grades and grade points for evaluating student work, including the thesis (please refer to the grade outline in the *CEU Student Records Manual*). Students who fail to submit work, or whose work fails to meet the minimum requirements for the assignment, will receive a grade of 'F.' The lowest passing grade is C+. At the end of each course, course instructors distribute a detailed breakdown of the course grade components. ***Failing a mandatory (core) course results in termination from the program.***