

# Methodology and Research Methods of Political Science

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**Class Time:** Tuesday, 14:40 – 17:40 (with 10 min. break). [Zoom](#), Meeting ID: 932 160 1081 Password: 3W9TXb

**Office hours:** Monday, 12:00 – 15:00, and by appointment. Office hours will be held in Zoom, link, ID and password are the same as for the class.

## Course Description

This course serves as an introduction to quantitative political methodology. We will first cover the general issues related to research design in political science. We will discuss problems of measurement and operationalization, validity and reliability of measurements, and the basics of writing research papers. After that we will proceed to the discussion of statistical methods and linear regression. We will start from first principles and gradually build skills required for thorough understanding of quantitative methods used in modern political science. Finally, we will also cover some of the topics from causal inference.

The class strives to maintain the balance between building theoretical understanding and practical implementation of specific methods. I strongly believe that one is impossible without the other. On the one hand, understanding theoretical underpinnings of a specific method is pivotal for realizing the limits of its use. On the other hand, the theory separated from practical implementation tends to be a bit dry, so getting acquainted with data management and actual implementation of different models is also important.

## Prerequisites

There are no formal prerequisites, but you should be prepared to work hard as certain topics can be quite challenging. Some knowledge of Python or R can be helpful but is not

required.

## Software and Computing

During this class, you will write quite a bit of code. All homeworks will be solved in Python, as you had the class on this language during the first module. If you want to use R, that's fine too, but I won't post solutions to coding assignments in R. That being said, I know R language, so I will definitely be able to help you. We will also use LaTeX for editing, so you will be able to learn this language as well if you never worked with it before.

## Important Dates

Midterm Exam .....	March, 29 - April, 4
Final Exam .....	June, 21 - June, 30

Midterm exam will be in open-book, take-home format. Final exam will be closed-book written exam with both multiple choice and open-ended questions.

## Grading

- All assignments will be graded using 10 point scale. At the end of the course, I will convert your scores into percentages of the final grade in accordance with the weight of each assignment.
- Each assignment contributes the following % to the final grade: Homeworks – 50 %, Midterm Exam – 20 %, Final Exam – 20 %, Participation – 10 %.

## Description of Assignments

- Homeworks

Homeworks will be distributed every two weeks (so you will have two weeks to complete one homework) and will be based upon the material covered in lectures. You should submit the written part of the assignment and the code, if required by the assignment, to me electronically by the deadline specified in the homework (normally two weeks after the homework is given). Every assignment must be edited in LaTeX.

- Midterm Exam

Midterm Exam will consist of both analytical and substantive questions. Exam will be in open-book, take-home format.

- Final Exam

Final Exam will consist of multiple choice and open-ended questions. I will announce the format (closed-book distance proctoring or in-class) later.

- Participation

I will take participation during every class. In addition, laboratory sessions and lectures will contain interactive elements which require your active engagement – this will also count as part of this grade.

## Grade Appeals

If you wish to appeal a grade you have received, you must submit a one-page computer-edited (e.g., in Word) statement to me at least 24 hours after receiving the grade. The statement must clearly and thoroughly explain the reasons why your work deserved a higher grade. Your assignment will then be re-graded, taking your statement into consideration. **The revised grade may be higher, lower, or the same as the initial grade.**

## Learning Format

As of now, learning format is distance learning. All classes will be held on Zoom. [The link to the meeting](#). The meeting ID: 932 160 1081 Password: 3W9TXb

It is vital that you use a clearly identifiable login name when attending the meeting because I will collect participation records using Zoom's meeting participants' list functionality.

## Course Outline

Introduction .....	January, 26
Research Design .....	February, 2
Elements of Causal Inference & Rubin Causal Model .....	February, 9
Central Limit Theorem and the Law of Large Numbers .....	February, 16
Difference-in-Means and Hypotheses Testing .....	March, 2
Bivariate Linear Regression & Its Interpretation .....	March, 9
Multiple Linear Regression & Gauss-Markov Theorem I .....	March, 16
Multiple Linear Regression & Gauss-Markov Theorem II .....	March, 23
Multiple Linear Regression – Violations in Assumptions .....	April, 9
Introduction to MLE models .....	April, 13
Logit & Probit Models .....	April, 20
Event Count Models .....	April, 27
Discrete Choice Models for Multiple Categories .....	May, 11
Duration Models .....	May, 18
Randomized Experiments .....	May, 25
Difference-in-Difference Estimator .....	June, 1
Instrumental Variables Estimator .....	June, 8
Regression Discontinuity Design .....	June, 15

## Readings

The following four books are mandatory for this class:

**Casella, George, and Roger L. Berger. 2002. *Statistical Inference*. Duxbury.**  
(henceforth CB)

**Wooldridge, Jeffrey M. 2013. *Introductory Econometrics: A Modern Approach*. 5 ed. South-Western Cengage Learning.** (henceforth W)

**King, Gary, Robert O. Keohane, and Sidney Verba. 1994. *Designing Social Inquiry: Scientific Inference in Qualitative Research*. Princeton University Press.** (henceforth KKV)

**Geddes, Barbara. 2003. *Paradigms and Sand Castles. Theory Building and Research Design in Comparative Politics*. The University of Michigan Press.**  
(henceforth G)

Greene, William H. 2003. *Econometric Analysis*. 5ed. Pearson Education.  
(henceforth Greene)

This website explains many statistical topics and provides proofs to some important theorems: [StatLect](#)

Most statistical topics we are going to discuss are widely covered in many books, so if there is some other text that works better for you, feel free to use it as well.

Detailed reading lists for each topic are provided in the next section. **Required readings are mandatory and must be read prior to the class. Recommended readings are optional. I may choose to introduce additional readings as the course progresses, but I will always notify you about that in advance.**

## Schedule

### January, 26 – Week 1

Introduction. Course overview. Principles of scientific research.

***Recommended Readings:***

- This syllabus.
- Clark, William Roberts, Matt Golder, and Sona Nadenichek Golder. 2018. *Principles of Comparative Politics*, 3 ed. SAGE. Chapter 2.
- Popper, Karl. 1992[1959]. *The Logic of Scientific Discovery*. Routledge. Chapters 1-4, 10.
- G. Chapter 1.

### February, 2 – Week 2

Research design in political science. Research questions, principles of theorizing and data collection.

***Required Readings:***

- KKV, Chapters 1 - 2.

***Recommended Readings:***

- G. Chapters 2 - 5.

## February, 9 – Week 3

Causal inference and Rubin Causal Model. Statement of the problem that causal inference seeks to solve. Assumptions of causal inference. Potential outcomes. Assignment mechanisms. Stability assumption (SUTVA). Introduction to randomization.

### ***Required Readings:***

- Imbens, Guido W., and Donald B. Rubin. 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences. An Introduction*. Cambridge University Press. Chapters 1, 3.
- Holland, Paul W. 1986. “Statistics and Causal Inference”. *Journal of the American Statistical Association* 81 (396): 945-960.
- KKV, Chapter 3.

## February, 16 – Week 4

Law of large numbers. Central Limit Theorem.

### ***Required Readings:***

- CB, Chapter 5, 5.5 - 5.8.

## March, 2 – Week 5

Difference-in-means test. Confidence interval. Hypothesis testing and p-values. Type I and type II errors.

### ***Required Readings:***

- W, Appendix C, parts 5 - 6.

### ***Recommended Readings:***

- CB, Chapters 8 and 9.

## March, 9 – Week 6

OLS estimation of bivariate regression. Interpretation of bivariate regression results. Implementation of bivariate regression in Python.

### ***Required Readings:***

- W, Chapter 2.

## March, 16 – Week 7

Introduction to multiple regression. Multiple regression in matrix form. OLS estimation of multiple regression. Gauss-Markov Theorem. Implementation of bivariate regression in Python.

### *Required Readings:*

- W, Chapter 3, Appendix D and E.

## March, 23 – Week 8

Inference in multiple regressions. Hypotheses testing and confidence intervals. Asymptotic properties of OLS estimators.

### *Required Readings:*

- W, Chapters 4 and 5.

## April, 9 – Week 9

Violations of standard Gauss-Markov assumptions. Heteroskedasticity. Model misspecification. Non-zero expectation of error terms.

### *Required Readings:*

- W, Chapters 8 and 9.
- KKV, Chapters 4 and 5.

## April, 13 – Week 10

Maximum Likelihood Estimation (MLE) in economics and political science. Common families of MLE models. General principles of MLE estimation.

### *Required Readings:*

- W, 769-770.
- Greene, Chapter 17, 17.1-17.3.
- CB, Chapter 7, 315-324.
- [Statlect – Maximum Likelihood](#)

## April, 20 – Week 11

Logit & Probit models. Estimation and interpretation.

***Required Readings:***

- W, 17.1.
- Greene, Chapter 21, 663-686.
- King, Gary, Michael Tomz, and Jason Wittenberg. 2000. “Making the Most of Statistical Analyses: Improving Interpretation and Presentation.” *American Journal of Political Science* 44(2):341–355.
- Zeev, Maoz, and Bruce Russett. 1993. “Normative and Structural Causes of Democratic Peace.” *The American Political Science Review* 87(3): 624–638.
- Carter, David B., and Curtis S. Signorino. 2010. “Back to the Future: Modeling Time Dependence in Binary Data.” *Political Analysis* 18(3):271–292.
- Beck, Nathaniel, Jonathan N. Katz, and Richard Tucker. 2000. “Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable.” *American Journal of Political Science* 42(4):1260–1288.

## April, 27 – Week 12

Event Count models. Estimation and interpretation.

***Required Readings:***

- Greene, Chapter 21, 740 - 752.
- King, Gary. 1988. “Statistical Models for Political Science Event Counts: Bias in Conventional Procedures and Evidence for the Exponential Poisson Regression Model.” *American Journal of Political Science* 32(3): 838–863.
- Mahmood, Rafat, and Michael Jetter. 2019. “Communications Technology and Terrorism.” *Journal of Conflict Resolution* 64(1): 127–166.

## May, 11 – Week 13

Discrete choice models for multiple categories. Estimation and interpretation.

***Required Readings:***



- Greene, Chapter 21, 719-740.
- Alvarez, R. Michael, and Jonathan Nagler. 1998. “When Politics and Models Collide: Estimating Models of Multiparty Elections.” *American Journal of Political Science* 42(1): 55–96.
- Moral, Mert, and Andrei Zhirnov. 2018. “Issue Voting as a Constrained Choice Problem.” *American Journal of Political Science* 62(2): 280–295.

## May, 18 – Week 14

Duration models. Estimation and interpretation.

### ***Required Readings:***

- Greene, Chapter 22, Section 5.
- Gates, Scott, Havard Hegre, Mark P. Jones, and Havard Strand. 2006. “Institutional Inconsistency and Political Instability: Polity Duration, 1800–2000.” *American Journal of Political Science* 50(4): 893–908.
- Bennett, D. Scott. 1997. “Testing Alternative Models of Alliance Duration, 1816-1984.” *American Journal of Political Science* 41(3): 846–878.

## May, 25 – Week 15

Randomized experiments.

### ***Required Readings:***

- Imbens, Guido W., and Donald B. Rubin. 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences. An Introduction*. Cambridge University Press. Chapter 4.
- Bertrand, Marianne, and Sendhil Mullainathan. 2004. “Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination”. *The American Economic Review* 94 (4): 991 - 1013.
- Chattopadhyay, Raghavendra, and Esther Duflo. 2004. “Women as Policy Makers: Evidence from a Randomized Policy Experiment in India”. *Econometrica* 72 (5): 1409 - 1443.

- Enikolopov, Ruben, Vasily Korovkin, Maria Petrova, Konstantin Sonin, and Alexei Zakharov. 2013. “Field Experiment Estimate of Electoral Fraud in Russian Parliamentary Elections”. *Proceedings of the National Academy of Sciences* 110 (2): 448-452.
- Frye, Timothy. 2019. “Economic Sanctions and Public Opinion: Survey Experiments From Russia”. *Comparative Political Studies* 52 (7): 967-994.

***Recommended Readings:***

- Beath, Andrew, Fotini Christia, Georgy Egorov, and Ruben Enikolopov. 2016. “Electoral Rules and Political Selection: Theory and Evidence from a Field Experiment in Afghanistan”. *The Review of Economic Studies* 83 (3): 932-968.
- Broockman, David E., and Donald P. Green. 2014. “Do Online Advertisements Increase Political Candidates’ Name Recognition or Favorability? Evidence from Randomized Field Experiments”. *Political Behavior* 36 (2): 263-289.
- Duflo, Esther, Abhijit Banerjee, Rachel Glennerster, and Michael Kremer. 2006. “Using Randomization in Development Economics: A Toolkit”. *Handbook of Development Economics*.
- Gerber, Alan S., Donald P. Green, and Christopher W. Larimer. 2008. “Social Pressure and Voter Turnout: Evidence from a Large-Scale Field Experiment”. *American Political Science Review* 102 (1): 33-48.
- Nickerson, David W. 2008. “Is Voting Contagious? Evidence from Two Field Experiments”. *American Political Science Review* 102 (1): 49 - 57.
- Collier, Paul, and Pedro C. Vicente. 2013. “Votes and Violence: Evidence from a Field Experiment in Nigeria”. *Economic Journal* 124 (574): F327 - F355.
- Wantchekon, Leonard. 2003. “Clientelism and Voting Behavior: Evidence from a Field Experiment in Benin”. *World Politics* 55 (3): 399-422.
- Frye, Timothy, Ora John Reuter, and David Szakonyi. “Vote Brokers, Clientelist Appeals, and Voter Turnout: Evidence from Russia and Venezuela”. Forthcoming in *World Politics*.

## June, 1 – Week 16

Difference-in-differences estimator. Requirements for the data. Applications of difference-in-difference design.

### ***Required Readings:***

- Angrist, Joshua D., and Jorn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press. Section 5.2.
- Card, David, and Alan B. Krueger. 1994. “Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania”. *American Economic Review* 84 (4): 772-793.
- Weintraub, Michael. 2016. “Do All Good Things Go Together? Development Assistance and Insurgent Violence in Civil War”. *Journal of Politics* 78 (4): 989-1002.

### ***Recommended Readings:***

- Abadie, Alberto. 2005. “Semiparametric Difference-in-Difference Estimators”. *Review of Economic Studies* 72 (1): 1-19.
- Athey, Susan, and Guido W. Imbens. 2006. “Identification and Inference in Nonlinear Difference-in-Difference Models”. *Econometrica* 74 (2): 431-491.
- Blundell, Richard, Amanda Gosling, Hidehiko Ichimura, and Costas Meghir. 2007. “Changes in the Distribution of Male and Female Wages Accounting for Employment Composition Using Bounds”. *Econometrica* 75 (2): 323-363.
- Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. 2004. “How Much Should We Trust Differences-in-Differences Estimates?” *Quarterly Journal of Economics* 119(1): 249-75.

## June, 8 – Week 17

Instrumental variables estimation. Criteria for a good instrument. Two-stage least squares.

### ***Required Readings:***

- Angrist, Joshua D., Guido W. Imbens, and Donald B. Rubin. 1996. *Identification of Causal Effects Using Instrumental Variables*. *Journal of the American Statistical Association* 91(434): 444-455.

- Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. “The Colonial Origins of Comparative Development: An Empirical Investigation”. *American Economic Review* 91(5): 1369-1401.
- Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. 2004. “Economic Shocks and Civil Conflict: An Instrumental Variables Approach”. *Journal of Political Economy* 112 (4): 725 - 753.

***Recommended Readings:***

- Angrist, Joshua D., and Alan B. Krueger. 2001. “Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments”. *Journal of Economic Perspectives* 15 (4): 69-85.
- Wright, Austin L., Luke N. Condra, Jacob N. Shapiro, and Andrew C. Shaver. 2017. “Civilian Abuse and Wartime Informing”. Working paper.
- Iyer, Lakshmi. 2010. “Direct versus Indirect Colonial Rule in India: Long-Term Consequences”. *Review of Economics and Statistics* 92 (4): 693-713.

## June 15 – Week 18

Regression discontinuity estimator. Finding appropriate data. Sharp and fuzzy designs. Bandwidth selection. Nonparametric vs. semiparametric approaches.

***Required Readings:***

- Imbens, Guido W., and Thomas Lemieux. 2008. “Regression Discontinuity Designs: A Guide to Practice”. *Journal of Econometrics* 142 (2): 615-35.
- MW, Section 11.2
- Angrist, Joshua D., and Jorn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist’s Companion*. Princeton University Press. Chapter 6.
- Dell, Melissa. 2010. “The Persistent Effects of Peru’s Mining Mita”. *Econometrica* 78 (6): 1863 - 1903.
- Ferwerda, Jeremy, and Nicholas L. Miller. 2014. “Political Devolution and Resistance to Foreign Rule: A Natural Experiment”. *American Political Science Review* 108 (3): 642-660.

***Recommended Readings:***

- Eggers, Andrew, Olle Folke, Anthony Fowler, Jens Hainmueller, Andrew Hall, and James Snyder. 2015. “On the Validity of the Regression Discontinuity Design for Estimating Electoral Effects: New Evidence from Over 40,000 Close Races”. *American Journal of Political Science* 59 (1): 259–274.
- Dell, Melissa. 2015. “Trafficking Networks and the Mexican Drug War”. *American Economic Review* 105 (6): 1738-1779.
- Van Der Klaauw, Wilbert. 2002. “Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression–Discontinuity Approach”. *International Economic Review* 43(4): 1249–1287.
- Thistlewaite, Donald, and Donald Campbell. 1960. “Regression-Discontinuity Analysis: An Alternative to the Ex-Post Facto Experiment”. *Journal of Educational Psychology* 51: 309–317.