

**Spring 2018 Syllabus**  
**API-202A and API-202B**  
**Empirical Methods II**

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API-202B – Miguel Ángel Santos ([miguel\\_santos@hks.harvard.edu](mailto:miguel_santos@hks.harvard.edu), Rubinstein 423)

Class meetings: MW 10:10 - 11:30 AM  
Review sections: F 1:15 - 2:30 PM (TF Evgenii Fadeev, [efadeev@g.harvard.edu](mailto:efadeev@g.harvard.edu))  
F 2:45 - 4:00 PM (TF Andrew Bacher-Hicks, [abacherhicks@g.harvard.edu](mailto:abacherhicks@g.harvard.edu))  
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### Course Description

This course equips you with tools necessary to conduct and understand empirical analysis of public policy problems that you might encounter in a professional environment. Specifically, the course introduces you to the use of multiple regression analysis and program evaluation for analyzing data in the social sciences. The emphasis is on empirical applications.

The course is designed with two objectives in mind. The first is to provide you with the ability to analyze critically the empirical analysis done by others at a level sufficient to make intelligent decisions about how to use that analysis in the design of public policy. The second is to provide you with the skills necessary to perform empirical policy analysis on your own, or to participate on a team involved in such an empirical analysis. An important segment of the course focuses on program evaluation. This includes both the design and analysis of experiments and non-experimental methods to evaluate policy effectiveness.

### Prerequisite

A knowledge of statistics at the level of API-201 is required.

### Textbooks (optional)

- Stock and Watson (2007). [Introduction to Econometrics, 2nd ed. Pearson Addison-Wesley.](#)
- Angrist, J. and Pischke, J-S., *Mastering 'Metrics*, Princeton University Press (2015).
- Wooldridge (2009). *Econometrics: A Modern Approach*, 4th ed. South-Western Cengage Learning.

### Grading

You will be graded on: problem sets (20%), midterm exam (30%), final exercise (15%), final exam (35%). The midterm and final will be closed book and closed notes. All students are expected to be present. Final grades follow HKS' curve: A (10-15%), A- (20-25%), B+ (30-40%), B (20-25%), B- or lower (5-10%).

## Problem Sets

- 1) Turn in answers to all problem sets, which will be graded by the course assistants. Detailed answers will be posted for you to review.
- 2) To receive credit, problem sets must be submitted by the start of class on the day they are due.
- 3) You may work on the problem sets in small groups. You must, however, write up your answers individually, in your own words. Put the names of your study group member(s) on your problem set. Duplicate answers will receive no credit and will be subject to disciplinary review.
- 4) Stata, a statistical software package, is available both in the computer lab and for [purchase directly](#) (Stata/IC, the cheapest option, is sufficient for our purposes and most things you'll do in life). There is also a very good tutorial at [http://www.cpc.unc.edu/research/tools/data\\_analysis/statatutorial](http://www.cpc.unc.edu/research/tools/data_analysis/statatutorial). Read the section titled "A simple example" through "Changing the data", then sign up for one of the TF-run introductory Stata sessions [here](#).

## Class Participation and Engagement

Student participation can substantially enrich the learning experience for both the students and the instructor. In this spirit, class participation is encouraged. Effective class participation requires that you read any assigned readings *before* coming to class. You are encouraged to ask questions, to share relevant insights you have from previous experiences, and to treat your classmates' participation with courtesy. We only ask that questions and comments be brief and related to the topic at hand. Given that this is a large class, we will sometimes need to defer questions to a future class or office hours. If you are on the margin between receiving two final grades, we will use the quality of your class participation to help determine which of the two grades you receive.

## Final Exercise

The final exercise will require you to work in small groups to apply some of the empirical methods learned in class to a data set relevant to a major public policy issue. More details will be provided later in the course.

## Regrade Policy

To submit a regrade request, submit the exam along with a clear statement of your concerns within two business days of the return of the graded exams. Your entire exam will be regraded.

## Failure Policy

Students whose final grades place them on the margin of failure will pass the course only if their final exam grade is greater than two standard deviations below the class mean.

## Academic Integrity

All course activities, including class meetings, homework assignments, and exams are subject to the HKS Academic Code and Code of Conduct. Note that discussion and the exchange of ideas are essential to academic work. For assignments in this course, you are encouraged to consult with your classmates. However, you should ensure that any written work you submit for evaluation is the result of your work and that it reflects your own approach and understanding of the topic.

## COURSE SCHEDULE

<u>Class</u>	<u>Date</u>	<u>Unit</u>	<u>Topic</u>	<u>Due</u>
1	1/22	Introduction	Evidence and policy	Biv rev in Fri sec
2	1/24		Causality and validity	
3	1/29	Linear regression	Multivariate regression	Problem set 1
4	1/31		Dummy variables	
5	2/5		Omitted variable bias	
6	2/7		Case study (OVB)	
7	2/12	Non-linear regression	Binary dependent variables	Problem set 2
8	2/14		Quadratic, logarithms	
9	2/21		Interactions	
	2/26	Midterm exam (in class)		
10	2/28	Experiments	Interpreting experiments	
11	3/5		Case study (experiments)	
12	3/7	Quasi-experiments	Instrumental variables	Problem set 3
13	3/19		Case Studies (IV - I)	
14	3/21		Case Studies (IV – II)	
15	3/26		Fixed Effects	Problem set 4
16	3/28		Difference in difference	
17	4/2		Case Study (DD-FE)	
18	4/4	Regression discontinuity		
19	4/9	Case study (RD)		
20	4/11	Conclusion	Review - Final exercise	Final exercise
	5/4	Final exam (2-5 PM)		

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## DETAILED COURSE PLAN

- (\*) Compulsory: These readings will be discussed in class.  
(\*\*) Suggested: Textbook readings that will deepen or complement knowledge of the topic.
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### Session #1: How evidence informs policy or why study econometrics at all?

- Dynarski, S. New York Times, November 22<sup>nd</sup>, 2017. [Laptops Are Great. But Not During a Lecture or a Meeting.](#) (\*)
- Stock and Watson (2007), 1. (\*\*)

### Session #2: Causality and validity

- Mosteller, M. (1995). [The Tennessee study of class size in the early school grades](#), The Future of Children, Critical Issues for Children and Youth, Vol 5. Num. 2, Summer/Fall. (\*)
- Stock and Watson (2007), 1.2, 3.4, 9.1, 9.4. (\*\*)
- Angrist and Pischke (2015), 1 (pp. 39-46) (\*\*)

[This week's Friday section will be a review of bivariate regression. We highly recommend attending.]

### Session #3: Multivariate regression analysis

- Bilmes and Stier (2010). [Freeze on federal jobs won't reduce spending.](#) (\*)
- Stock and Watson (2007), 4.1, 4.2, Appendix 4.1, 5.1, 5.2, 6.2, 6.3 (\*\*)
- Angrist and Pischke (2015), 2 (pp. 47-68) (\*\*)

### Session #4: Dummy variables

- Goldin (2017). [How to win the battle of the sexes over pay \(Hint: It isn't simple\).](#) (\*)
- Stock and Watson (2007), 5.3 (\*\*)
- Angrist and Pischke (2015), 2 (pp. 47-68) (\*\*)

### Session #5: Omitted variable bias

- Roy, Avik. National Review Online, July 17, 2010. [UVa Study: Surgical Patients on Medicaid Are 13% More Likely to Die Than Those Without Insurance.](#) (\*)
- Stock and Watson (2007), 6.1, 9.2 (pp. 316-318) (\*\*)
- Angrist and Pischke (2015), 2 (pp. 68-78) (\*\*)

### Session #6: Omitted variable bias (Case Study)

- Winig, L. (2012). Michelle Rhee's IMPACT on the Washington D.C. Public Schools. John F. Kennedy School of Government, Harvard University. (\*)

### Session #7: Binary dependent variables

- Bealik, Carl. FiveThirtyEight, February 16<sup>th</sup>, 2016. [Are you more likely to vote for a woman or a man? Republicans and Democrats answer that question very differently.](#) (\*)
- Stock and Watson (2007), 11.1, 11.2, Appendix 11.1 (\*\*)

### Session #8: Quadratic and logarithms

- Ozimek (2017). [Reducing immigration won't help places with the most Trump support.](#) (\*)
- Stock and Watson (2007), 8.1 (up to page 259), 8.2 (\*\*)
- Angrist and Pischke (2015), 2 (pp. 93-94) (\*\*)

### Session #9: Interactions

- Grotenhuis, M., Thijs, P. (2015). [Dummy variables and their interactions in regression analysis: examples from research on body mass index.](#) (\*)
- Stock and Watson (2007), 8.3 (\*\*)
- Angrist and Pischke (2015), 1 (\*\*)

## MIDTERM EXAM

### Session #10: Interpreting experiments

- Simeon et al. (1995). [Treatment of Trichuris trichiura infections improves growth, spelling scores and school attendance in some children.](#) (\*) (Focus on the abstract.)
- Angrist and Pischke (2015), 1 (\*\*)

**Session #11: Guest Lecturer Lant Pritchett: The RCT Debate on development is over. We won. They lost.**

### Session #12: Instrumental variables

- Madestam et al. (2013). [Do political protests matter? Evidence from the Tea Party Movement.](#) (\*) (Focus on the abstract and introduction.)
- Angrist and Pischke (2015), 3 (\*\*)
- Stock and Watson (2007), 12.1, 12.3 (\*\*)

### Session #13: Instrumental variables (Case Study I: The Colonial Origins of Comparative Development)

- Acemoglu, D., Johnson, S., and Robinson, J. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. The American Economic Review, Vol. 91, No. 5 (Dec., 2001), pp. 1369-1401.
- Stock and Watson (2007), 12.1, 12.3 (\*\*)

#### **Session #14: Instrumental variables (Case Study II: The Minneapolis Domestic Violence Experiment)**

- Angrist and Pischke (2015), Chapter 3, pp. 115-123. The Minneapolis Domestic Violence Experiment (MDVE) (\*)
- Stock and Watson (2007), 12.1, 12.3 (\*\*)
- Angrist and Pischke (2015), 3 (\*\*)

#### **Session #15: Fixed effects**

- Deming (2009). [Early Childhood Intervention and Life-Cycle Skill Development: Evidence from Head Start.](#) (\*) (Focus on the abstract, introduction and section 3B.)
- Stock and Watson (2007), 10.3, 10.4 (\*\*)

#### **Session #16: Difference-in-difference**

- Card and Krueger (1994). [Minimum Wages and Employment: A Case Study of the Fast-Food Industry in NJ and PA.](#) (\*) (Focus on the introduction and first 3 rows/columns of Table 3.)
- Stock and Watson (2007), 13.3 (\*\*)
- Angrist and Pischke (2015), 5 (\*\*)

#### **Session #17: Case study (fixed effects/difference-in-difference)**

- Goodman (2017). [The Labor of Division: Returns to Compulsory High School Math Coursework.](#) (\*)
- Stock and Watson (2007), 10.3-10.6 (\*\*)

#### **Session #18: Regression discontinuity**

- Cohodes and Goodman (2014). [Merit Aid, College Quality, and College Completion.](#) (\*)
- Angrist and Pischke (2015), 4 (\*\*)

#### **Session #19: Regression discontinuity (case study)**

- TBD

#### **Session #20: Conclusion: Review – Final Exercise**

- Hand in your final exercise at the start of class.