Advanced Quantitative Methods II (API-210)
Harvard Kennedy School
Course Syllabus – Spring 2017
December 15 version

FACULTY
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TEACHING TEAM
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DESCRIPTION
Intended as a continuation of Advanced Quantitative Methods I (API-209), this course focuses on
developing facility with the suite of econometric tools used in the empirical analysis of policy
questions. While this will require a familiarity with theoretical underpinnings of these techniques, the
emphasis of this course will be on their practical applications. Whenever possible, the econometrics
that we learn will be taught in the context of evaluating social programs, and how these tools can be
leveraged to more accurately assess causal impacts.

By the end of this course, you should be able to:

1. Conceptually understand the strengths and limitations of a wide range of econometric tools,
especially with respect to internal and external validity;
2. Be comfortable understanding the methods sections of a wide range of empirical economics
papers, and be able to adjust your interpretation of a paper’s results accordingly;
3. Conduct statistical analyses in Stata using these econometric techniques, and be able to
translate your findings into policy recommendations.

CLASS MEETINGS
Classes: Tuesday and Thursday 1:15 – 2:30, Land

Review Sessions: Friday 8:45 – 10:00 Land
Friday 10:15 – 11:30 L332
[You only need to attend one session]

PREREQUISITES
This course is designed for MPA/ID students, and is a continuation of the content from API-209. All
students who register for this course must have taken, or exempted from, API-209. Due to space
constraints, cross-registrants and auditors are not permitted.
**Readings**

The course material is self-contained and there is no required textbook for the course. Handouts covering most of the material will be distributed in class and through the course website. Some students might find it useful to have a textbook as an additional reference. Good reference books are:


Copies of all books will also be on reserve in the HKS library and available for purchase in the Coop.

**Stata**

Completing many problem sets will require the use of Stata. The course expects incoming students to have an introductory familiarity with the software, the structure of Stata commands, and the maintenance of do and log files.

The version you need is Intercooled Stata or better; Small Stata will not be adequate for this course. If you don’t have easy access to a computer with Stata or don’t want to do all your Stata work in computer labs, you may want to consider purchasing this software package from Stata directly (details here: http://www.stata.com/order/new/edu/gradplans/student-pricing/).

**Grading**

Your final grade will be based on the following criteria:

- Problem Sets 15%
- Class Participation/Engagement 15%
- Midterm Exam 25%
- Final Exam 45%

**Problem Sets (15%)**

Problem sets will be assigned on most weeks and will be due on the Thursday of that week at 10:10 AM. You should plan to spend approximately 8-10 hours on each problem set. Problem sets will be posted on the course website, as will suggested answers. They will be graded on a three-point scale:

- 3 points = check-plus
- 2 points = check
- 1 point = check-minus

Problem sets not received by the deadline will be considered late. There will be no credit for late assignments. The lowest problem set grade will be dropped when calculating the average grade for the problem sets.

Under the Harvard Kennedy School Academic Code, the problem sets for this course are “Type II” assignments unless indicated otherwise. **You are encouraged to work in a study group, but must submit your own solutions.** Examples of assignments that are not in accordance with the HKS academic code include reprints of substantially identical assignments, printouts of substantially identical Excel tables or Stata log files, and copies of solutions from previous years. Violations of the Academic Code are a serious violation of academic and professional standards and can lead to a failing grade in the course, failure to graduate, and even expulsion from the University. I take this issue seriously. If you have questions about the degree of collaboration allowed or about any other aspect of the Academic Code, please come to see me. The Kennedy School Academic Code is
Instructions for submitting problem sets:

- Turn them in electronically via the Canvas course page.
- Submit them by 10:10 AM on the day they are due (Thursday). Assignments submitted after class begins will be considered late.
- Indicate on the cover page the names of the classmates you worked with.

Class participation and engagement (15%)

Your willingness to contribute to the overall learning of your classmates is an important component of this class. To encourage this, your participation both inside and outside of class will be used in determining your grade in the course. Note that this assessment includes both the quantity and quality of your contributions.

- **Engagement in class:** A strong engagement in class means attending class regularly and punctually, engaging actively in all in-class activities, and in general contributing to a positive learning atmosphere in the classroom. My aim is to make our class a highly collaborative environment, using a combination of discussions, group work, and interactive voting. I hope to encourage you to ask questions about the topic at hand, provide explanations to your peers, and draw from your personal and professional experiences to inform your thinking. Given that this is a large class, I will sometimes need to defer questions for a future class or office hours. In order to better track participation, seating will be randomly assigned at the start of the semester. If you have any needs regarding placement in the classroom, please contact me.

- **Engagement outside of class:** Engagement with API-210 outside of class can come in many forms, most obviously in office hours and on the online discussion board. The discussion board will be a place where in-depth conversations can take place outside of the classroom. I plan to share articles and thoughts that are relevant to our coursework and encourage you to do the same. For those of you on Twitter, using the #api210 hashtag will funnel your tweet into the discussion board as well.

- **In-class technology policy:** We will be using a polling technology called Poll Everywhere in class, which requires use of an internet enabled device. When we are not actively using Poll Everywhere, technology use is not permitted. If you feel that your learning experience could be greatly enhanced by your use of technology in class, make an appointment with me and we can come to an agreement that will likely involve installing distraction reducing software on your device.

Midterm Exam (25%)

The midterm exam will be held on Thursday, March 9, from 1:15 PM to 3:15 PM. It will be a two-stage exam (see details below).

Final Exam (45%)

Please note that final exam will be held on Wednesday, May 3, from 3-6 PM. It will also be a two-stage exam (see details below).

Two-stage exams

The midterm and final exams will be two-stage exams. During Stage 1, you will be asked to complete the exam individually. After Stage 1, the exams will be collected and you will be given a second exam that will contain a subset of the questions from the original exam. During Stage 2, you will be asked to work with a group, reach consensus answers, and submit one copy of the exam for the whole
group. If your group grade is higher than your individual grade for that subset of questions, your grade for those questions will be 90% of your Stage 1 score and 10% of your Stage 2 score. If your Stage 2 grade is lower than your Stage 1 grade, we will not incorporate Stage 2 into your score. In other words, your Stage 2 grade can increase your overall exam score, but it cannot lower it.

The main reason we conduct a second stage of the exam is to allow you to learn more during the exam. Traditional exams tend to be summative rather than formative, and two-stage exams represent an opportunity to redress this imbalance. The process of discussing your answers with your teammates is a significant learning opportunity and supports the kind of collaborative learning that we encourage.

Regrade Policy

Requests for reconsideration of grades on exams are not encouraged, and will be accepted only in writing, with a clear statement of what has been incorrectly graded, and within one week of receiving your graded exam. Please submit your full exam so grading on all questions can be reconsidered.

All course activities, including class meetings, problem sets, and exams are subject to the HKS Academic Code and Code of Conduct.

Letter Grades

Grades for each exam and for each component of the course (problem sets, final exercise, and class participation and engagement) will be standardized (i.e. curved) and then an overall score for the course will be calculated for each student. This overall score will be translated into a final course letter grade using the Dean’s Recommended Grade Distribution (available at http://www.hks.harvard.edu/degrees/registrar/faculty/exams-and-grading/grades).

Other Items

Recording Classes

Classes will be video-recorded, and recordings will be available for two purposes. First, to provide you with the option of reviewing the class so you can clarify or deepen your understanding of a particular concept. Second, to help me improve my teaching. The recordings will be kept in a protected page that is accessible to you only via the course site. As a member of our learning community and to stimulate risk-taking and vigorous debate in class, you are expected to never make any recordings available outside of our learning community. If you are uncomfortable with classes being recorded, please make an appointment and speak with me.

Use of Data

Data will be collected in various forms in this course. Some forms of data collection will be obvious to you (such as when responding to a question on a survey) but others might not be (such as someone from our teaching team recording class participation or the Canvas course website system recording activity while you are logged in). Whatever the form of data collection, I pledge to use the data to help improve my teaching and ultimately your learning. This includes using your responses to online quizzes to tailor a class better to the backgrounds and learning needs of students in the class, conducting research about the effectiveness of a particular teaching approach, etc. I also pledge to keep your data confidential so that it can only be used for the purposes of improving teaching and learning or to help you and other students connect with future professional opportunities. The university-wide policy on use of Canvas data can be found here: https://wiki.harvard.edu/confluence/display/canvas/Harvard+Privacy+Policy+for+Canvas.
# API-210 Tentative Schedule

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<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
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<tbody>
<tr>
<td>Jan 24</td>
<td>Introduction: Course overview</td>
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<td>Jan 26</td>
<td>Qualitative Dependent Variables I: Motivation. Maximum Likelihood</td>
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<td>Jan 31</td>
<td>Qualitative Dependent Variables II: Probit and Logit</td>
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<td>Feb 2</td>
<td>Qualitative Dependent Variables III: Matching overview</td>
<td>Problem Set #1</td>
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<td>Feb 7</td>
<td>Qualitative Dependent Variables IV: Matching examples</td>
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<td>Feb 9</td>
<td>Qualitative Dependent Variables V: Ordered Probit and Censored Regression</td>
<td>Problem Set #2</td>
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<td>Feb 14</td>
<td>Quantile Regression: Estimation</td>
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<td>Feb 16</td>
<td>Quantile Regression: Inference. The Bootstrap</td>
<td>Problem Set #3</td>
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<td>Feb 21</td>
<td>Panel Data I: Fixed effects.</td>
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<td>Feb 23</td>
<td>Panel Data II: Difference-in-differences</td>
<td>Problem Set #4</td>
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<td>Feb 28</td>
<td>Panel Data III: Random effects</td>
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<td>Mar 2</td>
<td>Panel Data IV: Synthetic controls</td>
<td>Problem Set #5 (due Fri Mar 3)</td>
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<td>Mar 7</td>
<td>Midterm Review</td>
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<td>Mar 9</td>
<td>Midterm Exam: 1:15 PM – 3:15 PM</td>
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<td>Mar 14</td>
<td>SPRING BREAK</td>
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<td>Mar 16</td>
<td>SPRING BREAK</td>
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<td>Mar 21</td>
<td>Data collection</td>
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<td>Mar 23</td>
<td>Missing Data</td>
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<td>Mar 28</td>
<td>Nonparametric Regression I</td>
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<td>Mar 30</td>
<td>Nonparametric Regression II: Regression discontinuity</td>
<td>Problem Set #6</td>
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<td>Apr 4</td>
<td>Instrumental Variables I: Instrument validity</td>
<td>Problem Set #7 (joint w/ PED-102)</td>
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<td>Apr 6</td>
<td>Instrumental Variables II: Two-stage least squares</td>
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<td>Apr 11</td>
<td>Instrumental Variables III: Testing instrument validity</td>
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<td>Apr 13</td>
<td>Instrumental Variables IV: Examples</td>
<td>Problem Set #8</td>
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<td>Apr 18</td>
<td>Time Series Analysis I: Framework and Theory</td>
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<td>Apr 20</td>
<td>Time Series Analysis II: Examples</td>
<td>Problem Set #9</td>
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<td>Apr 25</td>
<td>Time Series Analysis III: Interrupted time series</td>
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<td>Apr 27</td>
<td>Course wrap up</td>
<td>Problem Set #10 (due Wed Apr 26)</td>
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<td>May 3</td>
<td>Final Exam: 3 PM – 6 PM</td>
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