Syllabus for 440.618 Micro-econometrics (Summer 2015: Online)

Johns Hopkins University Applied Economics Program

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Class Schedule: Summer 2015 Semester runs from Wednesday 13 May 2015 and ends 19 August 2015. We will have a 4th of July break between Wednesday 1 July 2015 and 7 July 2015. There are technically two “breaks” in the summer schedule, but the Memorial Day break is for classes that meet on Monday/Tuesday.

As an online class, there is no scheduled time for class; however, assignments will be due on Wednesdays at 9pm (Eastern Time Zone). The entire course will be available on Blackboard and students are allowed to work ahead if they desire.

Blackboard: The primary method of communication for this course is through Blackboard. Class notes, assignments, discussions, and announcements will be disseminated through this medium. Please check this website frequently. I will post announcements there and respond to discussion boards. If you have any additional questions, please feel free to contact me through email. However, assignments must be submitted through the Blackboard system for them to count.

Textbook: The textbook for this class is Microeconometrics: Methods and Applications by Cameron and Trivedi (ISBN: 0521848059). This is an advanced textbook with significant amounts of math to provide the theoretical underpinnings of many of the topics we will be discussing in class. If you are struggling with the notation, a good supplemental text is Mostly Harmless Econometrics by Angrist and Pischke (ISBN: 0691120358). It is a more intuitive supplement, but less mathematically rigorous and covers fewer topics than Cameron and Trivedi. Used copies of both should be readily available.

Course Outline: This class will build upon the fundamentals learned in the prerequisite statistics and econometrics courses. Advanced econometric techniques frequently employed in the analysis of household or individual-level micro data. The course begins with a review of some fundamental matrix algebra and probability theory. Other topics include difference-in-difference, ordinary least squares (OLS), instrumental variables, limited dependent variable analysis (Logit, Probit, Tobit, etc.), and panel data techniques. The class will focus on empirical examples and applications with support from economic and econometric theory through the lecture notes. The material will be posted in “units” and will include applicable Stata code that contains empirical examples of the concepts discussed in the lecture notes. Some units will also include in-depth discussion of empirical papers that employ techniques discussed during that unit. The course is designed with a significant amount of work early in the course to leave you sufficient time to work on the research project (discussed later in the syllabus) later in the semester.

Course Level Objectives: Lecture notes, assigned readings and discussion boards on Blackboard, will all help students gain an understanding of the empirical concepts covered in the course. Assignments and the semester-long research project will help students actively apply these concepts. Students will apply at least one technique learned during the course in their research project.
Research Project: As an empirically based class, we will focus on research and application of the methods learned in class through a semester-long research project. I have provided two cleaned data sets with data dictionaries (codebooks) on Blackboard that are ready for download and use. Unless you get special permission from me, these are the two data sets that will be used for your semester-long research project. You will formulate an empirical research question and use the data to answer it. These data sets are cleaned and ready for analysis. While you might have other interests or want to use other data sets, remember that data cleaning and management are both extremely tedious tasks and can take significantly longer than you expect. I will not prohibit you from using other data, but the same timeline must be met by all students. You will have the option of working in groups (up to 2 students) if you so choose.

Major components of the research project include:

1. Identifying one or more research (or policy) questions to address given your data
2. Using descriptive statistics to identify the limitations of your data and refine your research question(s) as necessary.
3. Specify hypotheses that you will empirically test.
4. Determine the most applicable statistical method for your data and analysis.
5. Specify your statistical model.
6. Conduct sensitivity analyses and robustness checks (if appropriate) of alternative model specifications.
7. Analyze and interpret the results and discuss them in relation to your original research questions and hypotheses.
8. Make a presentation to your peers of the findings, including a discussion of the analytical method you chose and your reasoning

Econometric Software: Empirical analysis is driven primarily through econometric software. As stated, you are free to use whichever software you are comfortable (SAS, Stata, SPSS, R, Matlab, etc.), but I will use Stata for examples in the course. If you use any other software besides Stata, it is up to you to provide your own support if you run into coding troubles. In the second week of class, I will provide a quick summary of basic Stata commands, but you will need to continue to sharpen your skills using these tools to successfully complete your research project. I will also use videos to discuss other examples in Stata and allow you to work through problems based on the code.

Grading and Deadlines: There will be a total of six (6) homework assignments that are worth 50% of your final grade. I have posted rubrics (when necessary) that explain how each assignment will be graded and what I am looking for you to have completed. Some of your homework assignments will help you continue to formulate and complete your semester long research project.

Assignment 1 [5%]: (Due: 27 May 2015) This is a simple introduction to basic Stata commands and analysis.

Assignment 2 [10%]: (Due: 3 June 2015) You will submit a research proposal that identifies the question(s) of interest for your research project. In this research proposal, you will include your data source and a general empirical framework to complete your analysis. The rubric is in the Assignment Guidelines section of Blackboard.
Assignment 3 [5%]: (Due: 17 June 2015) This is another Stata exercise that continues to build knowledge of econometric software and indicator/dummy variables and interaction terms.

Assignment 4 [10%]: (Due: 8 July 2015) You will complete a literature review for this assignment. The literature review may be on any topic. You can continue to develop your research paper by exploring the literature related to your topic. Alternatively, you can choose a completely different topic and submit a literature review that is unrelated to your final paper. The rubric is in the Assignment Guidelines section of Blackboard.

Assignment 5 [10%]: (Due 22 July 2015) You will submit a preliminary draft of your research paper that includes descriptive statistics and preliminary results. See the rubric in Assignment Guidelines.

Assignment 6 [10%]: (Due 29 July 2014) The final homework assignment returns to Stata analysis. You will estimate some models using data provide that we have discussed in class and then provide some analysis on the results.

Final Paper [30%]: (Due 12 August 2014) Your final research papers must be uploaded by 12 August 2015.

Presentation of Final Paper [10%]: (Due 19 August 2015) Students will prepare presentations of their final research paper and share them with the class in the final discussion board of the semester.

The final 10% of class grade will be based on participation and interaction in discussion boards throughout the semester.

Deadlines: All assignments must be uploaded no later than 9pm Eastern time on the due date. Late submissions will not be accepted and a grade of zero (0) for that assignment will be recorded. I will generally grade assignments and give feedback within a week of the due date. For general questions asked via email or the discussion forums, I will try to respond within 24 hours (48 hours on weekends).

Schedule: Each week (except one), we will cover a new topic that helps develop your understanding of micro-econometrics. Chapters associated with the material from the Cameron and Trivedi textbook are listed in parentheses. To reinforce the material from the textbook, I will supplement the readings with additional important empirical journal articles. These papers will apply the models and techniques discussed in the textbook and hopefully give a better understanding of how the models are used to analyze data. Lecture notes and supplemental readings are posted on Blackboard all semester.

Week 1: Course introduction and a review of matrix algebra and probability theory

Week 2: Econometric software introduction (Stata). Analysis of data sets (CPS and NLSY) for use in research projects.

Week 3: Explanation of micro-econometrics. What makes it different: data and models. Difference-in-Difference Estimation (Chapters 2 & 3)

Weeks 4 & 5: Ordinary Least Squares (Chapter 4)
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Week 6: Linear Models beyond OLS: Generalized Least Squares (GLS), Seemingly Unrelated Regression (SUR), Quantile Regression (Chapter 4)

Week 7 (includes July 4th break): Instrumental Variables (IV) (Chapter 4)

Week 8: Maximum Likelihood Estimation (MLE) (Chapter 5)

Week 9: Limited Dependent Variable Models (Logit and Probit) (Chapter 14)

Week 10: Multinomial Models (Chapter 15)

Week 11: Censored (Tobit) and Selection Models (Chapter 16)

Week 12: Panel Data (Chapter 21)

Week 13: No new material this week. Finalize and submit semester-long research paper by 12 August 2015.

Week 14: Each student will post a presentation of their research project in the final discussion topic of the semester no later than 19 August 2015.

Other Policies:

Problems with Blackboard: If you encounter any problems with Blackboard, please use the help listed in the “Technical Help” link for information. If you encounter any technical difficulties in completing or submitting any online assignment, please immediately contact the designated help desk listed on the AAP online support page. Also contact your instructor at the email address listed atop the syllabus.

University Policies:

General: This course adheres to all University policies described in the Academic Regulations and Zanvyl Krieger School of Arts and Sciences Advanced Academic Programs (AAP) Code of Conduct. Please review the documents and focus on important points about academic integrity and ethics. Ethical violations include cheating, plagiarism, re-use of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery or falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations witnessed to the instructor.

Plagiarism: Plagiarism is not tolerated. Electronic software will be used to evaluate submitted papers to ensure student work is their own and properly cited. Please read the Notice on Plagiarism. Ignorance of policies will not be accepted as an excuse for any violation.

Dropping or Withdrawing from the Course: You are responsible for understanding the university’s policies and procedures regarding withdrawing from the courses within the Applied Economics Program. You should be aware of the current deadlines according to the Academic Calendar.

Students with Disabilities: Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact the coordinator listed on the Disability Accommodations webpage. Further information and a link
to the Student Request for Disability Accommodations form page can also be found on the Disability Accommodations webpage.