

The Johns Hopkins University, Applied Economics Department

Syllabus for Microeconometrics (440.618.51)

Fall 2015

Instructor: Dr. Nadia Karamcheva

Email: nkaramc1@jhu.edu

Class schedule: Tuesdays 6:00pm-8:45pm, September 8 – December 8, 2015

We will typically meet in room 213. Occasionally we may have some of our meetings in the computer lab, for which I will let you know in advance.

Course Overview: This course will cover a range of advanced econometric techniques frequently encountered in the analysis of microdata. We will cover relevant theory during the lectures, which will be supplemented with discussion of empirical papers that employ the different techniques. The course is also designed to give students the opportunity to use these techniques in hands-on applications in the form of homework assignments, and a short research paper. The course will begin with a brief review of the classical regression model and its underlying assumptions. Then we will move on to cover topics including: instrumental variables, program evaluation, maximum likelihood, panel data models, discrete response models, duration analysis, and if time permits, non- and semi-parametric methods, and simulation-based methods.

Expectations and Grading: I expect, upon completing this class, students to have developed the following three types of skills: 1) understanding of when the use of a given estimator is appropriate or inappropriate; 2) practical knowledge of how to use the estimator in data analysis; and 3) ability to formulate an economic question, identify an appropriate estimation technique, perform the empirical analysis and interpret the results.

Each student's final grade will be determined by homework assignments, a short research paper, midterm and a final exam. The final exam will be cumulative, but will focus predominantly on the material covered in the second half of the class. There will be two or three homework assignments, whose goal is to familiarize you with Stata and to give you hands-on experience with the various techniques, which will help you for the research project. You are allowed and encouraged to collaborate and can submit the homework assignments in groups of up to 4.

The grade for the course will be based on:

1. Homework assignments (20%)
2. Midterm exam (20%)
3. Research paper (Preliminary draft 10%, Final Paper 25%)
4. Final exam (25%)

Textbook and Readings: The textbook for this class is "Microeconometrics – Methods and Applications" by Cameron and Trivedi (ISBN: 0521848059). I also recommend "Mostly Harmless Econometrics" by Angrist and Pischke (ISBN: 0691120358) and "Microeconometrics

Using Stata” by Cameron and Trivedi (ISBN: 1597180734) for in-depth demonstration of how to do microeconomic research with Stata.

Blackboard: Please check the Blackboard website for the class often. I will post announcements, suggested readings, and supplemental materials there.

Computing: Homework assignments and the research project will require the use of Stata, a general-use statistical package, to perform the applied econometric analysis. In addition, during class I will often illustrate theoretical concepts using Stata commands and output. I will cover a basic overview of Stata in Unit 2. Stata is available in the JHU computer lab, and can be purchased for home use at a student discount price: See <http://www.stata.com/order/new/edu/gradplans/campus-gradplan/> Please have in mind that Small Stata might not be suitable for your research project, as it only allows up to 1,200 observations and up to 99 variables. You might also want to check the JHU’s website with resources on using Stata: <http://www.stata.com/links/resources-for-learning-stata/>

Research Project: The research paper must be written solely for this course. It cannot be derivative of a paper written in this semester or a previous semester for another course. The paper can be on any topic you choose, but I would advise against a topic that requires new data collection. A **draft of the paper** will be due on **October 27th, 2015** and the **final version** will be due on **December 4th, 2015**. The draft paper should outline the question(s) of interest, provide literature review, describe the data source and the proposed empirical framework for the analysis, as well as include some descriptive statistics. The final paper should include the empirical results, as well as interpretation and discussion of those results.

Questions: Please do not hesitate to ask questions during class or during class breaks. Please also feel free to email me with questions. If there is sufficient demand, I may also hold periodic “office hours” in a location to be determined.

Important dates:

Midterm Exam: October 20th, 2015

Preliminary draft of research paper due: October 27th, 2015

Final draft of research paper due: December 4th, 2015

Final Exam: December 8th, 2015

Tentative schedule and Topics: I will teach the class in units. Once I’ve covered a unit, I will move on to the next one. Some will take one week, others might take more. The corresponding textbook chapters are listed, but I will also supplement the textbook readings with selected papers, which I will post on Blackboard prior to the lectures. To make the best use of your time during the lectures, I recommend that you skim the textbook chapter and papers before class, then go back and review them in more detail after class to reinforce what we covered.

Unit 1: Course introduction, Microeconomics Overview: Data and Causality (Chapters 2 & 3 in C&T; Chapter 1 & 2 in A&P).

Unit 2: Overview of statistical theory, matrix algebra, Ordinary Least Squares (OLS) in matrix form; Introduction to Stata.

Unit 3: Linear Models: OLS, Generalized Least Squares (GLS), Quantile Regression, Instrumental Variables (IV) (Chapter 4 in C&T; Chapters 3 & 4 in A&P)
Unit 4: Panel Data (Chapter 21 in C&T)
Unit 5: Maximum Likelihood and Nonlinear Least Squares Estimation (Chapter 5 in C&T).
Unit 6: Binary Outcome Models – Logit & Probit (Chapter 14 in C&T).
Unit 7: Multinomial Models (Chapter 15 in C&T).
Unit 8: Tobit and Selection Models (Chapter 16 in C&T).
Unit 9: Treatment evaluation, Propensity Score Matching, Differences-in-Differences, Regression Discontinuity, IV (Chapter 25 in C&T; Chapters 5 & 6 in A&P)
Unit 10: Event History Models (Chapter 17 in C&T)
Unit 11: Nonparametric and Semi-parametric methods (Chapter 9 in C&T)
Unit 12: Simulation-based methods: Bootstrapping, Monte Carlo Integration (Chapters 11 & 13 in C&T)

University Ethics Statement: The strength of Johns Hopkins University depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. You may consult the associate dean of students and/or the chairman of the Ethics Board beforehand. See the guide on “Academic Ethics for Undergraduates” and the Ethics Board web site for more information.

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Guidelines for Empirical Paper

The goal of the term paper is to put you in the role of a researcher or a policy analyst and provide you with the experience of formulating a research question, conducting the estimation and analyzing the results. The term paper should be well written and must use techniques developed in this course. The objective is to have you write a short (maximum of 5 pages of text) paper which demonstrates your ability to apply the econometric methods covered in this course and to write the results in a professional manner.

The paper will be graded equally on the basis of the clarity of the exposition and the level of econometrics. The text and tables should be in the same format found in economics journals. Look through empirical journals, such as the Review of Economics and Statistics, before writing your paper. For example, note that tables are clearly labeled and don't use acronyms, nor do they look like they were cut and pasted from computer output.

The page limit of 5 pages is imposed to make you focus on essentials. Use standard 1 inch margins and 12 point Times New Roman font. Editing is always better than trying to squeeze more in by reducing font size or reducing the margins.

I will post some datasets on Blackboard for you to use. You are also free to choose a different dataset, but get permission from me first. The paper must use cross section or panel data (not time series data) and must use techniques developed in this course. I strongly advise against spending a lot of time putting a data set together since the time taken to do that detracts from time spent on applying the econometrics and writing the results.

Empirical papers typically contain 4 sections:

- 1) The first section clearly formulates and motivates the policy or research question to address and specifies the hypothesis you want to test.
- 2) The second section describes the data, variable definitions and provides descriptive statistics. Avoid using acronyms.
- 3) The third section provides a formal description of the statistical model, including assumptions about the error structure and a discussion of identification. Write the model in terms of generic Y's X's and Z's or very simple notation (e.g., I_{it} for income of person i in year t), rather than the particular variables that you will use (e.g., ADJFAMINC). This helps clarify the econometric structure.

- 4) The fourth section provides results. Tables should be self-contained and understandable without reference to definitions used in the text. This requires that tables have clear headings and that variable names be readily understood. If appropriate, this section also includes sensitivity analyses of alternative model specifications.

The paper ends with a very brief conclusion that summarizes the findings of the study. You may depart from this generic structure, but be sure that there is a logical and consistent development of ideas. I also strongly encourage you to use headings. These help guide the reader and discipline the writer's organization.

You should attach the computer output which generated the results described in the paper. Circle and label the results so that I can easily match the output with the numbers in the paper.

Important!!! The paper should be your own work and must be written solely for this course. It cannot be derivative of any paper you have written in the past nor contain material used in any paper you are writing this semester. Any violation of this will result in a failing grade for the paper.