

## ECO 522: Applied Econometrics

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Fall 2018

Tu Th 11:30-12:50pm

Social and Behavioral Sciences room N632

Professor: Meta Brown  
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Office hours: Tu Th 2-3pm  
Office: Social and Behavioral Sciences room S645

Credits: 3  
Prerequisite: Graduate Standing in the Economics department or permission of the Graduate Director.

### Course description

Economics 522: Applied Econometrics is intended to develop practitioner's tools in graduate-level economists who have an established background in econometric theory and are beginning to pursue their own original research. We will emphasize methods popular in contemporary applied microeconomic and macroeconomic research, beginning each topic area with fundamentals and then, where possible, touching on recent innovations.

Topics to be covered include discrete dependent variable models estimated using both traditional and simulation methods; difference-in-differences estimation, with consideration of prior trends, event studies, and multiple testing corrections; treatment effects and program evaluation, to include randomized controlled trials, instrumental variables, regression discontinuity, and an information treatment laboratory example; panel data methods including fixed and random individual effects and cluster-robust inference; some application of simple time series concepts, including evidence of stationarity, methods of detrending, a simple Newey-West example, unit root tests, and cointegration; and, as time permits, some introduction to duration analysis and to the direct estimation of economic models.

### Grading

*40% Midterm* – An exam given at the end of all lectured material and before the group research presentations.

*20% Two problem sets* – These will be applications of tools discussed in lecture. Each will involve downloading a dataset and programming an estimator using the software of your

choice. I typically rely on Stata or SAS. A student Stata/IC license for the semester may be rented for \$45 via:

<https://www.stata.com/order/new/edu/gradplans/student-pricing/>

Many SBU students prefer R, which is downloadable for free here:

<https://www.r-project.org/>

I prefer Stata and may provide solutions or examples using Stata. Homework may be completed in groups of up to 4 students. Hence only one student in each group need rent Stata/IC in order for the group to use Stata for the semester. If you are having difficulty accessing Stata for your assignments, please see me for options.

*40% Research paper & presentation* – The research project may be completed independently or in groups of up to 4 students each. You should spend the next two weeks forming your groups. In two weeks, I will hand out a document describing research paper guidelines. Research project deadlines are marked in the schedule below.

### Schedule

This is my second shot at 522 (and yours first!) Therefore, I promise these topics (give or take), but I may juggle the order in which they appear. Importantly, your input regarding topics will be welcome as this new iteration of 522 materializes.

Aug 28, 30 – Review the course syllabus, Lecture 1: Treatment Effects and Program Evaluation. This week we lay out the framework, describe RCT conditions, consider endogenous attrition and selection on observables and unobservables, and examine the properties of IV under various assumptions.

Sept 4, 6 – Tuesday Sept. 4 continue Lecture 1: Treatment Effects and Program Evaluation. Next we derive and implement the RD estimator, and, finally, we consider recent laboratory and field studies using information treatments.

Sept 11, 13 – Lecture 2: Difference-in-differences. The simple estimator, regression-based estimator, the role of prior trends, and an application. *Research paper guidelines handed out and discussed.*

Sept 18, 20 – Lecture 2: Difference-in-differences. We turn to the event study and to multiple testing corrections.

Sept 25, 27 – Lecture 3: Discrete Outcomes. We begin with the binomial logit estimator, and then discuss the multinomial and conditional logit, and the IIA assumption.

*Research paper one-page proposal due from each group.*

Oct 2, 4 – Lecture 3: Discrete Outcomes. Next we turn to the binomial probit and then to the multinomial probit, and associated simulation methods.

Oct 9, 11 – Tuesday Sept. 9 faculty & staff development professional day, no lecture. Thursday Sept. 11 Lecture 4: Panel Data Methods. Fixed and random effects.

Oct 16, 18 – Lecture 4: Panel Data Methods. Cluster-robust Inference. Cameron & Miller (2015), Bertrand, Duflo, & Mullainathan (2004).

Oct 23, 25 – Lecture 5: Introduction to Time Series Methods. Stationary v. nonstationary time series, autocorrelation, Newey-West.

Oct 30, Nov 1 – Lecture 5: Introduction to Time Series Methods. Unit root test, cointegration. Paper: Each research group will schedule a half hour time to meet with me regarding their research project between 10/29 and 11/1. Thursday November 1: *Research paper first draft due from each group.*

Nov 6, 8 – Lecture 6: Duration Analysis. The discrete time conditional hazard model, and some lessons from the estimation of a simple search model.

Nov 13, 15 – Lecture 7: (Economic) Model-Based Estimation.

Nov 20, 23 – Tuesday Nov. 20 Midterm Exam. Thursday Nov. 22 no lecture, Thanksgiving break.

Nov 27, 29, Dec 4, 6 – *Research group presentations.*

Dec 19 – We will use our final exam period, Wednesday 12/19 11:15am-1:45pm, as the submission deadline for the research group papers. Papers are due to me via email, in pdf format, by the end of this exam period.

## Reading

There is no required text for this course. The homework and midterm exam will be based on the in-class lectures. Lecture slides will be posted online via Blackboard (<https://blackboard.stonybrook.edu>). Please contact me if you have difficulty accessing the ECO 522 page on Blackboard.

Supplementary reading that may be of use includes:

Greene, William H. *Econometric Analysis*, 8<sup>th</sup> edition, Pearson. ISBN-13: 978-0134461366, ISBN-10: 0134461363

Wooldridge, Jeffrey M. *Econometric Analysis of Cross Section and Panel Data*, 2<sup>nd</sup> edition, MIT Press. ISBN-13: 978-0134461366, ISBN-10: 0134461363

Paul A. Ruud, *An introduction to classical Econometric Theory*, Oxford University Press, 2000. ISBN 0-19-511164-8.

Steven Stern, "Simulation-Based Estimation," 1997.

<http://www.people.virginia.edu/~sns5r/resint/simulstf/simuljelt.pdf>

Petra Todd's lecture notes. Approximately all topics in "Microeconometrics" and "Program Evaluation" discussed here are relevant to us. <http://athena.sas.upenn.edu/petra/teaching.htm>

Christopher Flinn's lectures on model-based estimation.

[http://www.econ.nyu.edu/user/flinn/courses/CCA-2017/cca\\_minicourse\\_2017.html](http://www.econ.nyu.edu/user/flinn/courses/CCA-2017/cca_minicourse_2017.html) (Also see Flinn's minimum wage book, <https://mitpress.mit.edu/books/minimum-wage-and-labor-market-outcomes>.)

A reading list of research papers covered in lecture and some useful supplemental research papers will be distributed later in the semester.

The lecture notes to be posted will draw from discussion and insights in notes and circulating materials from Wilbert van der Klaauw, Mark Montgomery, Stern, Flinn, Michael Keane, Todd, Greene, Wooldridge, and Bruce Hansen, among others.

**Americans with Disabilities Act:** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC(Educational Communications Center) Building, Room 128, [\(631\)632-6748](tel:6316326748). They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. <http://studentaffairs.stonybrook.edu/dss/>

**Academic Integrity:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at [http://www.stonybrook.edu/commcms/academic\\_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html)

**Critical Incident Management:** Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.