Statistics 521: Applied Econometrics II

Spring 2022

Instructor

Paul Shaman, shaman@wharton.upenn.edu

Class Hours and Location

The class is fully online. All lectures are synchronous.
MW 1:45 – 3:15, via Zoom, accessed via Canvas.
Videotapes of all classes will be available on Canvas.

Office Hours

MTuTh 8:15−9:30 pm, and by appointment, via Zoom or BlueJeans

Teaching Assistant: Abhinandan Dalal, abdalal@wharton.upenn.edu

Course web site

Statistics 521 is using Canvas. You can gain access by going to https://canvas.upenn.edu.
All notes, homework assignments and data sets for the course will be distributed and
managed via the website.

Materials

Class notes. These will be available on Canvas. I will post notes in advance of the
lectures. Each posting will provide material for one or more lectures.

Econometric Analysis of Cross Section and Panel Data, 2nd ed., by Jeffrey M.
Wooldridge, MIT Press, 2010 . This is the main course text. I expect to cover topics in
Chapters 8 and 10; in part of Chapter 11; in Chapters 12–16; and in part of Chapter 18.

Mostly Harmless Econometrics, An Empiricist's Companion, by Joshua D. Angrist and
Jörn-Steffen Pischke, Princeton University Press, 2009. This is a book you should read
carefully in its entirety. It is written in a refreshing and entertaining style. However,
don't be fooled—it assumes a good deal of statistical understanding and can be quite
challenging.

Mastering 'Metrics: The Path from Cause to Effect, by Joshua D. Angrist and Jörn-Steffen Pischke, Princeton University Press, 2014. This is a sequel to *Mostly Harmless Econometrics, An Empiricist's Companion*. It is written in the same engaging style as *Mostly Harmless* and contains many examples.

Applied Econometrics with R, by Christian Kleiber and Achim Zeileis, Springer, 2008. This is a good reference for R basics and examples of the use of R. I have also posted on Canvas six documents which give R information and instruction.

(Optional) *Econometric Analysis of Panel Data*, 5th ed., by Badi H. Baltagi, Wiley, 2013. This is an in-depth examination of econometric methods for panel data models. Numerous empirical examples are included.

(Optional) *Econometrics*, by Fumio Hayashi, Princeton University Press, 2000. Hayashi's treatment differs substantially from that of Wooldridge. His presentation tends to be more mathematical, and it addresses concepts and topics from time series as it proceeds (we will consider only a few issues from time series). Moreover, Hayashi introduces generalized method of moments (GMM) estimation early in his presentation, noting that ordinary least squares and two-stage least squares are special cases. If your interests are mathematical, I encourage you to do some reading in Hayashi. It is instructive and very helpful to see an alternative presentation of econometrics.

Journal articles. I will use several journal articles for notes and discussion, and for homework assignments.

Software

The R package will be used in lectures and for homework. R is free software and is available at www.r-project.org.

Course overview

The aims of this course are to study basic econometric techniques. The emphasis will be upon the understanding and use of econometric methodology, and the written communication of the results of data analysis. Topics we will cover include panel data models, system estimation with instrumental variables, random effects and fixed effects models, M-estimation, nonlinear least squares, quantile regression, maximum likelihood, the generalized method of moments, binary and multinomial response models, and regression models for count data. We will examine the mathematical and statistical foundations of the methods, as well as their application. As in Applied Econometrics I, we will employ linear algebra extensively throughout, and we will discuss and apply results from probability and statistical theory.

Course requirements

There will be five homework assignments. These will include theoretical exercises and involve the analysis of data and interpretation of the findings, and the presentation of well-organized and clearly written reports. The homework is designed to teach and to give experience in the use of econometric methodology. You are encouraged to consult with each other in doing the homework, and also to contact the TA and me for help. ***You must submit your own proofs, calculations, and your own writeup***. ***Files should not be shared.*** Homework must be submitted by the due date specified for the assignment. ***All assignments will be submitted via Canvas.***

There will be a project. This will involve duplicating the analysis presented in an empirical paper, and possibly presenting further analyses of the data set used in the paper. As an alternative, you may use a data set of your own choosing and carry out an original analysis, using your own research. A major goal of this exercise is organization and presentation of a carefully written report. Prior to starting the project, you will submit a brief (not more than one page) project proposal for my review. ***This proposal is required***.

There are no examinations. The course grade will be calculated as 80 per cent homework and 20 per cent final project.

Spring 2022 Calendar

> The first class is Wednesday, 12 January.
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> There is no class Monday, 17 January—MLK, Jr. Day.
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> The course selection period ends Tuesday, 25 January.
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> The drop period ends Monday, 21 February.
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> Spring break week is Monday−Friday, 7−11 March.
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> Grade type change deadline is Friday, 18 March.
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> The withdrawal deadline is Monday, 28 March.
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> The last class is Wednesday, 27 April.
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> Reading days are 28 April–1 May.
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> Final exams are 2–10 May.

Class dates (all class presentations are synchronous)

There are 28 classes (Monday, Wednesday schedule).

Week	Class dates
10 January	1/12
17 January	1/19
24 January	1/24, 26
31 January	1/31, 2/2
7 February	2/7, 9
14 February	2/14, 16
21 February	2/21, 23
28 February	2/28, 3/2
7 March	Spring break week
14 March	3/14, 16
21 March	3/21, 23
28 March	3/28, 30
4 April	4/4, 6
11 April	4/11, 13
18 April	4/18, 20
25 April	4/25, 27