Course Syllabus

ECON 82800
Panel Econometrics

City University of New York – Graduate Center
Spring 2019
R 9:30-11:30, Graduate Center, 365 5th Ave, Room 6421

Professor Contact Information
Wim Vijverberg
GC 5313.04, Phone: (212)817-8262
Office hours: T 2:30-4:00 and by appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions
The prerequisite for this class is ECON 82100, Econometrics I. Students probably will benefit from having had ECON 82200 (Econometrics II), ECON 82300 (Applied Microeconometrics), and/or ECON 82400 (Applied Macroeconometrics), but those courses are not a pre- or corequisite. There are no other pre- or corequisites or other restrictions for enrollment in this course. Students are advised that the course may include discussions of mathematical micro- and macroeconomic models and econometric techniques that authors have used in their empirical models.

Course Description
This course provides a theoretical and empirical overview of econometric techniques that may be used when studying panel data. Panel data are pooled observations of a cross-section of units such as individuals, households, firms, states, or countries, over time. The number of pooled observations per unit does not have to be the same, but that case does present some further complications. When feasible, the theoretical discussion of econometric techniques will be illustrated with empirical studies that use those same techniques. The techniques can also be used when cross-sectional data consist of groups, for example by city, state, and so forth, rather than of pooled data over several years.

Student Learning Objectives/Outcomes
This course promotes student learning in various ways:
1. Understand the advantages and disadvantages of panel data as compared to other data structures
2. Learn econometric techniques for panel data
3. Study applications in various fields of economics
4. Apply these techniques in appropriate data settings
5. Explore statistical/econometric software in regard to panel-econometric techniques

Assessment: Grading Policy, Assignments, and Exam Dates
The semester grade will be based on a midterm exam, a final exam, several homework assignments, and a project proposal. The weights of these are:
Midterm exam (March 21) ................................................. 35 %
Final exam (May 16) ................................................... 35 %
Homework assignments (various dates) ................... 15 %
Project proposal ......................................................... 15 %

The midterm exam covers the more introductory material of the course and thus relates to learning objectives (1) and (2).

The final exam is not cumulative but rather covers material discussed in the second half of the semester (which, however, builds on the foundation laid in the first half). Thus, it covers the more advanced topics and relates to learning objectives (2), (3) and (4).

Homework assignments apply new techniques learned in this course to data that are available on the internet, some at the Wiley Publisher’s website and others elsewhere. There will be approximately four homework assignments. The software that will be used in this course is Stata, but if you know how to complete the same assignment with another software package (e.g., EViews, SAS, Matlab, R), that is acceptable. The homework assignments relate to learning objectives (4) and (5).

The aim of the project proposal is to draft the outlines of a research project that utilizes panel econometrics techniques. A successful paper outlines the research question, the relevant background in economic theory, the reason for panel econometrics techniques, the nature of the data that are needed for this project (whether in existence or not), and the type of panel econometric model that can address the research question. This assignment relates to learning objectives (1) and (4).

If the circumstances so demand, these descriptions and timelines are subject to change at the discretion of the Professor.

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Required Textbook


Journal articles may be added to the list of readings that is provided below.

Other Helpful Course Materials

The following texts may be useful to students of the econometrics of panel data. The reading list refers to some of these texts explicitly.

Cameron, A.C., and P.K. Trivedi, Microeconometrics Using Stata. Stata Press, Revised edition., 2010.

Software References

Stata: www.stata.com
R: plm package: see http://cran.r-project.org/web/packages/plm/
Matlab: Panel Data Toolbox: see http://www.pandalatatoolbox.com
### Course & Instructor Policies

Absence from any exam must be properly documented; otherwise a grade of 0 is assigned to a missed exam. Make-up exams are scheduled within the same week for those who missed an exam with proper documentation.

There is no extra credit work.

Homework assignments that are handed in after the due date are penalized 10% per business day.

Cellphones and pagers must be turned off. Recording the lecture is not permitted.

### Reading Assignments

The following is a tentative calendar for this semester. Readings may be added at any time. References to specific books are given on p.2 above.

1. **Introduction (31 Jan.)**
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.1
   - Hsiao, *Analysis of Panel Data*, 3rd ed., Ch. 1, 13

2. **One-way error component model (7 Feb. – 14 Feb.)**
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.2
   - Hsiao, *Analysis of Panel Data*, 3rd ed., Ch.3.1-5
   - Greene, *Econometric Analysis*, 7th ed., Ch.11.3-5
   - Cameron & Trivedi, *Microeconometrics Using Stata*, Ch.8
   - Arellano, *Panel Data Econometrics*, Ch.2

3. **Two-way error component model (21 Feb.)**
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.3
   - Hsiao, *Analysis of Panel Data*, 3rd ed., Ch.3.6
   - Greene, *Econometric Analysis*, 7th ed., Ch.11.3-5
   - Pesaran, *Time Series and Panel Data Econometrics*, Ch.26.8, 26.10

4. **Hypothesis testing (28 Feb.)**
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.4
   - Pesaran, *Time Series and Panel Data Econometrics*, Ch.26.9
   - Greene, *Econometric Analysis*, 7th ed., Ch.11.5

5. **Heteroskedasticity and serial correlation (7 Mar)**
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.5
   - Hsiao, *Analysis of Panel Data*, 3rd ed., Ch.3.7-8
   - Greene, *Econometric Analysis*, 7th ed., Ch.11.6

6. **Other ways of modeling heterogeneity in panel data models (14 Mar.)**
• Pesaran, Time Series and Panel Data Econometrics, Ch.28:1-5
• Pesaran, Time Series and Panel Data Econometrics, Ch.29:1-4

Midterm Exam (21 March)

7. Seemingly unrelated regression model (28 Mar.)
   • Baltagi, Econometric Analysis of Panel Data, 5th ed., Ch.6

8. Simultaneous equation model (4 Apr.)
   • Baltagi, Econometric Analysis of Panel Data, 5th ed., Ch.7
   • Hsiao, Analysis of Panel Data, 3rd ed., Ch.5
   • Greene, Econometric Analysis, 7th ed., Ch.11.8
   • Cameron & Trivedi, Microeconometrics Using Stata, Ch.9

9. Dynamic panel data model (11 Apr.)
   • Baltagi, Econometric Analysis of Panel Data, 5th ed., Ch.8
   • Hsiao, Analysis of Panel Data, 3rd ed., Ch.4
   • Arellano, Panel Data Econometrics, Ch.7-8
   • Pesaran, Time Series and Panel Data Econometrics, Ch.27
   • Pesaran, Time Series and Panel Data Econometrics, Ch.28:6-11
   • Pesaran, Time Series and Panel Data Econometrics, Ch.29:5-8
   • Manuel Arellano and Bo Honore, “Panel data models: some recent developments.” In J. Heckman and E. Leamer, eds., Handbook of Econometrics, Vol.5, North Holland, 2001, Ch.53, Sec.2-3
   • Maurice J.G. Bun & Vasilis Sarafides, Oxford Handbook of Panel Data, Ch.3
   • Hyungsik Roger Moon, Benoit Perron, and Peter C.B. Phillips, Oxford Handbook of Panel Data, Ch.4

10. Models for unbalanced panel data (18 Apr.)
    • Baltagi, Econometric Analysis of Panel Data, 5th ed., Ch.9
    • Pesaran, Time Series and Panel Data Econometrics, Ch.26.
    • Jushan Bai, Yuan Liao, and Jisheng Yang, Oxford Handbook of Panel Data, Ch.5

11. Limited dependent variable models (2 May)
    • Baltagi, Econometric Analysis of Panel Data, 5th ed., Ch.11
    • Manuel Arellano and Bo Honore, “Panel data models: some recent developments.” In J. Heckman and E. Leamer, eds., Handbook of Econometrics, Vol.5, North Holland, 2001, Ch.53, Sec.6-7
12. Nonstationary data (9 May)

- Hsiao, *Analysis of Panel Data*, 3rd ed., Ch.10
- In Choi, “Panel cointegration.” *Oxford Handbook of Panel Data*, Ch.2
- Pesaran, *Time Series and Panel Data Econometrics*, Ch.31

Review of Brownian motion and unit root data


Spurious regression with panel data


Testing for stationarity in panel data


Panel data models with factor structures


Monte Carlo evidence


13. Spatial data and panel econometrics (??)

14. Attrition in Panel Data (??)

15. Other special topics (??)
   - Baltagi, *Econometric Analysis of Panel Data*, 5th ed., Ch.10
   - Hsiao, *Analysis of Panel Data*, 3rd ed., Ch.9, 11, 12
   - Erik Meijer, Laura Spierdijk, and Tom Wansbeek, “Measurement error in panel data.” *Oxford Handbook of Panel Data*, Ch.11

**Final Exam (May 16)**

**Datasets**

The textbook author provides six datasets on the Wiley Publisher’s website.¹ To understand these data, when they get used in this course, the following papers should be read:


**Academic Integrity**

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

¹ See [http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118672321&bcsId=4338](http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118672321&bcsId=4338), click on “Browse by Resources” and then on “Datasets”. You need to register to use these and other resources.
Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one’s own work or material that is not one’s own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university’s policy on plagiarism.

Email Use
I recognize the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. For this reason, I will consider email from students official only if it originates from a “gradcenter” student account. This allows me to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information.

Withdrawal from Class
The administration of this institution has set deadlines for withdrawal of any course. These dates and times are published in the academic calendar. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.