Advanced Econometrics Methods: Panel Data

TIME: 9:30-10:45 Tuesday-Thursday

Instructor: Marco Costanigro

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Email: marco.costanigro@colostate.edu

Office Hours by appointment (PM hours)

Texts:


Course Objectives:
The successful student will, by the end of the course, be able to:

• Identify data generating processes requiring panel-specific methods
• Choose the appropriate model and estimator (e.g. fixed effects, random effects), and defend the choice using theory and formal testing
• Empirically estimate models for panel data, and correctly interpret results
• Be aware of potential pitfalls and limitations inherent to the chosen modeling approach

Course topics
1. Linear panel models: pooled models, fixed effects and random effects
2. Extensions to the linear panel models: Generalized Method of Moment, dynamic models, Hausman-Taylor hybrid model, difference in differences estimator
3. Nonlinear panel models

Homework Exercises
I will assign 3 group homework exercises. You may work in groups of up to 4 people. If you choose to work in a group, which is highly encouraged, please submit only one copy of each assignment with the names of the participants on the front.

Computer Software:
No specific econometric software is mandated, but homework assignments will imply the joint use of “canned” software (e.g. STATA) and a matrix environment software (e.g. Gauss or MATA). While I will provide some basic guidance, I expect students to use manuals and online help to self-teach the use of the chosen statistical software.
Course Evaluation:
As a default, the grades are as assigned as follows: A = ≥ 90%; B = 80-89%; C = 70-79%; D = 60-69%; F = < 60%. Pluses and minuses will be used at the discretion of the instructor.

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<th>Group Homework Exercises</th>
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<td>Exam</td>
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Course Policies and Exceptions

1. **Homework exercises** are due on the stated due date. Beyond that, no assignments will be accepted.
2. If you have a [documented disability](http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf) that requires special arrangements, please let the instructor know immediately at the beginning of the course.
3. **Academic integrity** is expected. No cheating will be accepted, period. This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog-1.6, pages7-9.
   [http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf](http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf) and the Student Conduct Code
   [http://www.conflictresolution.colostate.edu/conduct-code](http://www.conflictresolution.colostate.edu/conduct-code).
   At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.
4. Always show appropriate respect for your instructor and fellow students. This means, among other things, that cell phones should be muted prior to class.

### Tentative class schedule (subject to change at the instructor’s discretion)

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<tr>
<th>AREC/ECON 736 b Panel Data Analysis</th>
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<td>Nonlinear panel models (if time allows)</td>
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Tentative list of topics (subject to change at the instructor’s discretion)

1. Linear panel models (4/5 lectures)
   a. Nature of longitudinal data: within and between variation
   b. Unexplained heterogeneity in the individual effects model: correlated vs. uncorrelated effect
   c. Linear panel models
      - Pooled OLS and robust estimation of the v-cov
      - Fixed (correlated) effect models
         1. LSDV model
         2. Within estimator
         3. First difference model
      - Uncorrelated effects models
         1. Between estimator
         2. Random effect model
   d. Will it work? Conditions for consistency
   e. Fixed vs. random effects: Tradeoffs and intuition
   f. Which one to use? Random vs. fixed effect models (Hausman test)

2. Panel GMM (3 lectures)
   a. The longitudinal dimension as a source of instruments
   b. Random and fixed effects IV GMM
   c. Hausman-Taylor hybrid model
   d. Arellano-Bond Estimator

3. Nonlinear panel model (2-3 lectures)
   a. General setup for nonlinear model
   b. Fixed effects models and the incidental parameter model
   c. The Poisson panel model