Panel-data analysis using Stata  
ICPSR Summer Program  
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This workshop provides an introduction to the econometric methods for analyzing panel data and how to perform them using Stata. Morning sessions will introduce methods using a mixture of lecture and hands-on practice. Afternoon sessions will be mostly hands-on computer sessions using Stata. Both example data and simulation techniques will be used to build intuition for the covered methods.

This course will describe methods for datasets with many panels and few time periods. For this type of data, the course will cover linear fixed-effects and random-effects models, linear dynamic panel-data models, and nonlinear fixed and random-effects models.

This course assumes familiarity with the linear regression model, the two-stage least-square estimator, and with the maximum-likelihood estimator of the probit model as explained in Wooldridge (2006). The course will describe the generalized method-of-moments estimation technique and use it extensively throughout the class. I recommend that you be familiar with the material in Cameron and Trivedi (2005, Sections 6.1–6.5). Wooldridge (2002, chapter 14) presents similar results from a more theoretical point of view.

Calculus, linear algebra, and basic probability theory are used throughout the class.

**Schedule**  
On Monday - Thursday the schedule will be  
8:30 - 12:00  
12:00 - 1:00  
1:00 - 4:30  
On Friday the schedule will be  
8:30 - 12:00

**Textbook**  
There is no required textbook for this class.  
I recommend that you have access to either Wooldridge (2002) or Cameron and Trivedi (2005) for the theory and that you have access to Cameron and Trivedi (2009) for the Stata material.
Outline

• Day 1
  – After doing a quick introduction to Stata, we review the ordinary least-squares (OLS) estimator and learn how to use simulation techniques to understand the large-sample properties of this estimator.

• Day 2
  – After we look at the potential costs and benefits of panel-data and study the pooled-OLS estimator, we study estimators for the parameters of random-effects and fixed-effects models and specification tests for which model is more appropriate.

• Day 3
  – We begin by discussing linear mixed models.
  – Next, we study instrumental-variables estimators and generalized-method-of-moments (GMM) estimators for the parameters of linear models with endogenous variables.
  – We begin discussing GMM estimators for the parameters of linear dynamic models.

• Day 4
  – We finish discussing GMM estimators for the parameters of linear dynamic models.
  – We begin studying estimators for the parameters of nonlinear models with fixed effects and random effects. We also discuss how the individual-specific approach embodied in random-effects and fixed-effects models differs from the population-averaged approach. We will also discuss parameter interpretation in some depth.

• Day 5
  – We finish studying the estimation and interpretation of nonlinear models for panel data. In particular, we discuss GMM estimators for some nonlinear models for panel data.
References


___ and ___, Microeconometrics Using Stata, College Station, Texas: Stata Press, 2009.
