Advanced Topics in Dynamic Panel Models

ICPSR Summer Program in Quantitative Methods of Social Research

July 20-22, 2020

**Time:** 11:00AM-7:00PM Eastern

**Location:** Online instruction

**Instructor:** Dr. Andrew Q. Philips and Dr. Mark Pickup

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**COURSE DESCRIPTION:** Data collected over both units (e.g., individuals, states, countries) and time (e.g., days, months, years)—known as time series cross-sectional data or panel data—are common in the social sciences. By gaining leverage both across units and over time, these data help us answer important questions that would be difficult if we only looked at a single point in time (e.g., cross section) or single unit (e.g., time series): the relationship between growth and democracy, whether or not the resource curse exists, or how economic perceptions shape support for the government. Despite these advantages, panel data often show types of heterogeneity and dynamics that make standard regression approaches inappropriate.

This course is designed to survey several advanced topics in panel data. After a review of panel data fundamentals, we will cover topics such as panel unit root and cointegration tests, panel error correction models, and approaches to modeling dynamics in panel data with a small $T$.

By the end of this course you should be able to:

- Understand a variety of threats to inference when working with cross-sectional time series data
- Understand techniques to model cross-sectional time series data for a variety of $N$ and $T$
- Apply what you have learned to your own research

**PREREQUISITES:** At least one semester long graduate-level regression course. We will use both R/RStudio and Stata in this course. If you are not familiar with both, you should review Philips’ “Introduction to Stata” and “Introduction to R” in the course readings folder. We will also release course materials on Dropbox, so please sign up if you do not have an account before the first day of class (a basic account is free). This course will be taught virtually, and we will use Zoom, so please have that downloaded before the first day (no need to create a paid account if you don’t already have one).

**REQUIRED TEXTS:** There are no required texts for this course. Course materials will be made available to you on the first day. There are several additional texts you might find helpful (grouped by topic):

- Time Series

- Cross-Sectional Time Series

**SCHEDULE:**

**Day 1:**

Panel data fundamentals, testing and modeling temporal dependence

Required Readings:

Suggested Readings:

**Day 2:**

Panel unit root and cointegration tests, unobserved heterogeneity, panel error correction models, and pooled mean group estimators

Required Readings:

Suggested Readings:


**Day 3:**

Modeling panel data with small T and overcoming Nickell bias (GMM, transformed-likelihood, estimators)

Required Readings:


Suggested Readings:


**Last updated:** March 24, 2020