

Local Projections for Applied Economics

Òscar Jordà (San Francisco FED, UC Davis and CEPR)
June 30-July 2, 2025

Kiel Institute, Berlin

Course description

Researchers are often interested in calculating how variables respond over time to a given stimulus, such as a policy intervention. This is often referred to as an impulse response. The method of local projections offers a convenient approach to investigate such impulse response dynamics. This course explores the basics of the local projections method (including identification, estimation, multipliers, and inference), presents several extensions (such as smoothing, stratification, and nonlinearities) and discusses different approaches to evaluate policy responses (such as matching estimators and optimal policy perturbations). The course will also discuss extensions to panel data and difference-in-differences estimation.

Because the method of local projections is very straightforward in easy to scale, the ultimate goal is to equip practitioners with appropriate methods for their research problems and inspire new research avenues.

Objectives

At the end of this course, participants will:

- Understand the foundations of local projections and their connection to vector autoregressions (VARs)
- Know how to do basic estimation, including proper identification and statistical inference.
- Be able to apply local projections in analysis of time series and panel data.

Method

The course will combine virtual classroom lectures, which will include the presentation of the main concepts as well as live demonstrations of statistical code in using STATA.

The slides and additional learning materials will be provided to participants to help them apply their new knowledge and skills in practice.

Topics

Introduction to local projections

Exploring the link between vector autoregressions and local projections. Implications of the World decomposition. Small sample bias corrections. Multipliers and counterfactuals. Summary of best practices.

Identification with local projections

Short- and long-run based identification. Inverse propensity score weighting. Identification with external instruments. Local projections for cointegrated systems and identification implications.

Pointwise inference for local projections

Pointwise inference. Lag augmentation. System estimation using the generalized method of moments (GMM). Simultaneous inference. Significance bands. Summary of best practices.

Simultaneous inference for local projections

System estimation using the generalized method of moments (GMM). Simultaneous inference. Significance bands. Summary of best practices.

Smoothing

Introduction to main ideas. Smoothing methods overview. Gaussian basis function approximations.

Matching methods

Minimum distance estimation basics. Local projections matching estimation. System projection instrumental variables. Macroeconomic policy evaluation—optimal policy perturbations.

Stratification, heterogeneity, and time-varying impulse responses

Identification in nonlinear settings. Stratified local projections. The Kitagawa-Oaxaca-Blinder decomposition. Time-varying impulse responses. Context-dependent impulse responses.

Local projections with panel data

Panel data basics. Inference best practices depending on the dimensions of the panel.

Local projections difference-in-differences

Difference-in-differences (DiD) basics. Staggered, absorbing treatments. Introduction to LP-DiD. Difference-in-differences using local projections. Relation to two-way fixed effects, Sun-Abraham, Callaway-Sant'Anna. Illustration.