

Local Projections in Macroeconomic Analysis: Theory and Applications

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Course Description

This short course (12 hours total) introduces the use of Local Projections, LPs, as a flexible tool for impulse-response analysis in macroeconomics. The course combines theoretical unpinnings with hands-on empirical applications. Topics include model specification, state dependence, identification strategies, and inference issues. Particular emphasis is placed on applied examples, including work by the instructor.

Applications are performed using the free and open-source econometric software GRET. Students can opt for different code languages.

Syllabus

1. Introduction and Motivation (1 hour)

What are local projections? Why move beyond VARs?

Strengths and limitations of LPs.

Overview of macroeconomic questions tackled with LPs.

Reading: Jordà (2005); Ramey (2016)

2. Estimating the Basic LP Model (2 hours)

Forecast horizon structure. Specification and estimation.

Treatment of standard errors (HAC/Newey West). Choosing controls and lag structure.

Implementation.

Hands-on session: Estimating a baseline LP and visualizing IRFs

3. Nonlinear LPs and State Dependence (2 hours)

Why nonlinearities?

Smooth Transition Local Projections (STLPs). Threshold models.

Applications: asymmetric fiscal or monetary effects.

Application: Global supply chain stress and monetary policy (Ventosa-Santaulària et al., 2024)

4. Identification Strategies in LPs (3 hours total)

a. Internal Identification à la Jordà (1 hour) Exogeneity assumptions and control strategies. Lead-lag exogeneity and sequential ordering.

b. Recursive (Choleski-style) Identification (1 hour)

Connecting LPs with traditional VAR identification.

Example: Fiscal or monetary shocks under ordering assumptions.

c. External Instruments and IV-LP (1 hour) Motivation and conditions: relevance, exogeneity. LP-IV setup and interpretation

Case: U.S. monetary shocks in emerging economies.

Readings: Auerbach & Gorodnichenko (2012); Hernández, Ventosa-Santaulària & Valencia (2024)

5. Inference and Robustness (1 hour)

Confidence bands and bootstrap.

Sensitivity to functional form and lag structure.

When LPs and VARs agree (and when they don't).

Optional readings: Plagborg-Møller & Wolf (2021); Montiel Olea & Plagborg-Møller (2021)

6. Final Workshop (Evaluation) and Discussion (3 hours)

Implementation and replication of a selected empirical application using local projections.

Submission of a short empirical report as final assignment, including code and results. Interpretation and critical evaluation of findings.

Brief presentation and discussion of students' own research ideas or related empirical questions.

Q&A Session and concluding remarks.

Prerequisites

Knowledge of time series econometrics (unit roots, VARs, HAC estimators).

Familiarity with basic macroeconomic models.

Software will be introduced in class.

References

Auerbach, A. J., & Gorodnichenko, Y. (2012). Measuring the output responses to fiscal policy.

American Economic Journal: Economic Policy, 4(2), 1–27.

Hernández, J. R., Ventosa-Santaulària, D., & Valencia, J. E. (2024). Global supply chain inflationary pressures and monetary policy in Mexico. *Emerging Markets Review*, 58, 101089.

Jorda, O. (2005). Estimation and inference of impulse responses by local projections.

American Economic Review, 95(1), 161–182.

Montiel Olea, J. L., & Plagborg-Møller, M. (2021). Local projection inference is simpler and more robust than you think. *Econometrica*, 89(4), 1789–1823.

Plagborg-Møller, M., & Wolf, C. K. (2021). Local projections and VARs estimate the same impulse responses. *Econometrica*, 89(2), 955–980.

Ramey, V. A. (2016). Macroeconomic shocks and their propagation. *Handbook of macroeconomics*, 2, 71–162.

Ventosa-Santaulària, D., Tapia, E., & Pérez-Peña, A. K. (2024). Inflation dynamics under different weather regimes: Evidence from Mexico. *Ecological Economics*, 220, 108179.