

Macroeconomic Policy Analysis: Identification, Estimation, and Evaluation

Instructor: Lukas Hack | Teaching assistant: Albert Hidalgo | Language: English

Term: WS 2026/27 | Course: E385 | 4 SWS | ECTS: 6

Course description

This course introduces empirical methods for studying the causal effects of macroeconomic policies on macroeconomic aggregates. We introduce methods to identify these shocks and estimate their dynamic effects using local projections (LPs). Various applications, e.g., to monetary and fiscal policy, are introduced to illustrate the methods and relevant specification choices required in practice. The course brings students close to the research frontier in empirical macroeconomics and prepares them to replicate published papers and conduct their own research for a bachelor thesis.

Learning outcomes

By the end of the course, students will be able to:

- explain what an impulse response measures and when a regression coefficient identifies it.
- estimate local projections and construct confidence intervals using appropriate standard errors.
- justify a range of important specification choices, and assess the sensitivity of the results.
- understand various identification strategies, incl. short-run restrictions and external instruments.
- interpret empirical findings and assess their economic significance and limitations.
- write Python code to prepare data, estimate LPs, and present the results in adequate formats.

Prerequisites

Students should have a background in undergraduate econometrics, linear algebra, and intermediate macroeconomics.

Topics

The following topics describe the planned sequence of the course. A topic may extend over more than one lecture.

0. Motivation.

Why do correlations in macroeconomic data often give misleading answers to causal questions? A monetary policy example illustrates reverse causality and the role of exogenous shocks. We then explain why effects estimated from cross-sectional data need not equal aggregate effects, and discuss the assumptions required by empirical and structural approaches. *Refs:* [Ramey \(2016, §1\)](#).

1. Estimands from structural models.

We solve a dynamic New Keynesian model with expectations using the method of undetermined coefficients. Its moving-average representation describes how monetary policy, demand, and supply shocks affect the economy over time. We use this representation to derive impulse responses and show when local projections recover them. *Refs:* [Galí \(2015, Chapter 3\)](#).

2. Estimation and inference.

We estimate local projections by OLS and construct confidence intervals, focusing on Newey–West and lag-augmented heteroskedasticity-robust inference. Simulations illustrate how lagged controls and time trends can improve precision, how contemporaneous controls can distort the estimated effect, and how outcome transformations change its interpretation. An application to US monetary policy examines the sensitivity of the results to these choices. *Refs:* [Ramey \(2016\)](#); [Montiel Olea and Plagborg-Møller \(2021\)](#); [Jordà \(2005\)](#).

3. Identification.

We discuss a range of approaches to identify structural shocks including short-run zero restrictions,

high-frequency identification, and policy rule regressions. *Refs:* [Ramey \(2016\)](#).

4. Instrumental variables.

We introduce local projections with external instruments and discuss the identifying assumptions, estimation, and inference, including the implications of weak instruments. *Refs:* [Stock and Watson \(2018\)](#); [Ramey \(2016\)](#).

5. Practical issues.

We discuss practical issues in implementing local projections, including small-sample bias, persistent variables, cumulative responses, and robustness checks. *Refs:* [Ramey \(2016\)](#); [Montiel Olea et al. \(2025\)](#); [Piger and Stockwell \(2025\)](#); [Herbst and Johannsen \(2024\)](#).

6. Applications: identification in practice.

We discuss empirical applications of the identification strategies to monetary policy, fiscal policy, and oil supply shocks. *Refs:* [Ramey \(2016\)](#).

7. State-dependent local projections.

We first show how non-linearities can be interpreted through the lens of a New Keynesian model. Then, we discuss the estimation, identification, and interpretation of state-dependent local projections. *Refs:* [Hack et al. \(2026\)](#).

8. Vector autoregressions.

We introduce vector autoregressions (VARs), discuss their identification, and compare impulse response estimation using VARs and local projections. *Refs:* [Ramey \(2016\)](#); [Plagborg-Møller and Wolf \(2021\)](#).

9. Panel local projections with macroeconomic shocks.

We introduce panel local projections with macroeconomic shocks and discuss relative and aggregate effects, heterogeneous responses, and inference. *Refs:* [Almuzara and Sancibrián \(2024\)](#).

10. Local projections and difference-in-differences.

We discuss identification, estimation, and interpretation in difference-in-differences applications. *Refs:* [Dube et al. \(2025\)](#).

Assessment

The course grade is based on a take-home exam/project involving coding, data analysis, a written report, and possibly a short presentation. Students should plan several days to complete the assessment. Further details will be announced during the term.

Tutorials

Tutorials are led by Albert Hidalgo. They complement the lectures with guidance on conducting your own empirical research and implementing the lecture methods in Python. Students will work with data and write their own code.

Disclaimer

This course is taught for the first time. The syllabus is tentative and may change during the term.

References

- Almuzara, M. and V. Sancibrián (2024). Micro Responses to Macro Shocks. *Federal Reserve Bank of New York Staff Reports*, No. 1090.
- Blanchard, O. and R. Perotti (2002). An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output. *Quarterly Journal of Economics* 117(4), 1329–1368.
- Dube, A., D. Girardi, Ò. Jordà and A. M. Taylor (2025). A Local Projections Approach to Difference-in-Differences Event Studies. *Journal of Applied Econometrics*.
- Galí, J. (2015). *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and Its Applications*, 2nd ed. Princeton University Press.
- Gertler, M. and P. Karadi (2015). Monetary Policy Surprises, Credit Costs, and Economic Activity. *American Economic Journal: Macroeconomics* 7(1), 44–76.
- Hack, L., K. Istrefi and M. Meier (2026). Identification of Systematic Monetary Policy. Working paper.
- Herbst, E. P. and B. K. Johannsen (2024). Bias in Local Projections. *Journal of Econometrics*.
- Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review* 95(1), 161–182.
- Montiel Olea, J. L. and M. Plagborg-Møller (2021). Local Projection Inference Is Simpler and More Robust Than You Think. *Econometrica* 89(4), 1789–1823.
- Montiel Olea, J. L., M. Plagborg-Møller and C. K. Wolf (2025). Local Projections or VARs? A Primer for Macroeconomists. *NBER Working Paper*.
- Piger, J. and H. T. Stockwell (2025). Should Local Projections With Observed Shocks Be Estimated in Levels or Differences? *Journal of Applied Econometrics*.
- Plagborg-Møller, M. and C. K. Wolf (2021). Local Projections and VARs Estimate the Same Impulse Responses. *Econometrica* 89(2), 955–980.
- Ramey, V. A. (2016). Macroeconomic Shocks and Their Propagation. In J. B. Taylor and H. Uhlig (eds.), *Handbook of Macroeconomics*, Vol. 2A, ch. 2, 71–162. Elsevier.
- Romer, C. D. and D. H. Romer (2004). A New Measure of Monetary Shocks: Derivation and Implications. *American Economic Review* 94(4), 1055–1084.
- Stock, J. H. and M. W. Watson (2018). Identification and Estimation of Dynamic Causal Effects in Macroeconomics Using External Instruments. *Economic Journal* 128(610), 917–948.