



TRAINING COURSE | ONLINE

SPATIAL PANEL DATA ECONOMETRICS USING STATA

14-15, 17-18 December 2026

Spatial dependence and spatial heterogeneity characterize many economic and social phenomena, including regional growth, innovation, labour markets, migration, electoral dynamics, public health and environmental processes. When data are observed over both space and time, panel structures allow researchers to control for unobserved heterogeneity and to capture how spatial spillovers evolve dynamically — but they also raise distinctive estimation and inference challenges.

This course provides a comprehensive introduction to modern spatial panel data econometrics, with a strong emphasis on empirical implementation using the statistical software *Stata*. It covers static and dynamic spatial panel specifications, endogeneity and instrumental variables estimation, spatial Durbin panel models and cross-sectional dependence. Participants will learn how to prepare longitudinal spatial datasets, estimate and compare alternative specifications, and interpret short-run and long-run direct and indirect effects.

In common with TStat's course philosophy, each session is composed of both a theoretical component, in which the techniques are fully explained through a series of course-specific examples, and an applied, hands-on segment, during which participants implement the techniques on real-world datasets under the guidance of the course tutor.

This is Module Two of the two-part Spatial Econometrics using *Stata* training pathway. It builds naturally on the contents of Module One, dedicated to spatial cross-sectional econometrics, but is also suitable as a standalone course for participants who already have a working knowledge of spatial weights matrices and cross-sectional spatial regression models.

By the end of the course participants will be able to:

- understand spatial dependence and spatial heterogeneity in panel settings;
- prepare and manage longitudinal spatial datasets in *Stata*;
- distinguish between static and dynamic spatial panel structures;
- estimate static spatial panel models with fixed and random effects, including spatial lag and spatial error specifications;
- apply quasi maximum likelihood estimation and instrumental variables methods;
- estimate spatial Durbin and higher-order spatial panel models;
- estimate dynamic spatial panel models and interpret short-run versus long-run effects;
- test for and address cross-sectional dependence;
- perform specification testing, model selection and robustness analysis;
- implement advanced spatial panel analyses independently.

COURSE CODE

D-EF41

SPATIAL PANEL DATA ECONOMETRICS USING STATA

TARGET AUDIENCE

The course is designed for:

- Ph.D. students;
- researchers in economics, regional science, geography, political science and related disciplines;
- analysts working in public institutions, central banks, policy agencies and international organizations;
- professionals interested in applied spatial data analysis.

PREREQUISITES

Participants are expected to have:

- basic knowledge of econometrics;
- familiarity with linear regression and panel data models;
- introductory knowledge of maximum likelihood estimation;
- working knowledge of *Stata* and do-file programming;
- a working knowledge of spatial weights matrices and cross-sectional spatial regression (as covered in Block One — Spatial Cross-Sectional Econometrics using *Stata*) or equivalent prior experience.

PROGRAM

SESSION I: INTRODUCTION TO SPATIAL PANEL DATA MODELS

1. Spatial panel data structures
2. Static vs dynamic spatial panels
3. Fixed effects vs random effects
4. Spatial dependence in panel settings
5. Advantages of spatial panel models

Practical Session in Stata

1. Panel and spatial declarations
2. Preparing longitudinal spatial datasets
3. Spatial panel setup
4. Managing panel spatial objects

SESSION II: STATIC SPATIAL PANEL MODELS

1. Spatial fixed-effects models
2. Spatial random-effects models
3. Spatial lag and spatial error panel models
4. Quasi Maximum Likelihood estimation
5. Model selection strategies

Practical Session in Stata

1. Estimating spatial panel regressions
2. Using `spxtregress`
3. Diagnostic testing
4. Comparing specifications

SDM
 $PWY + XB + W$
 $\theta = 0$

SPATIAL PANEL DATA ECONOMETRICS USING STATA

SESSION III: ADVANCED SPATIAL PANEL MODELS

1. Endogeneity in spatial panels
2. Instrumental variables estimation
3. Multiple endogenous covariates
4. Higher-order spatial interactions
5. Spatial Durbin panel models

Practical Session in Stata

1. IV estimation in spatial settings
2. Endogenous interaction models
3. Advanced panel specifications
4. Robustness analysis

SESSION IV: DYNAMIC SPATIAL PANEL MODELS

1. Dynamic spatial dependence
2. Temporal and spatial lags
3. Global stability conditions
4. Short-run vs long-run effects
5. Dynamic spillovers

Practical Session in Stata

1. Dynamic spatial panel estimation
2. Simulation exercises
3. Interpretation of dynamic effects
4. Stability analysis

SESSION V: CROSS-SECTIONAL DEPENDENCE AND ADVANCED TOPICS

1. Weak and strong cross-sectional dependence
2. Cross-sectional dependence tests
3. Heterogeneous coefficients
4. Recent developments in spatial econometrics
5. Empirical applications and policy interpretation

Practical Session in Stata

1. CD tests
2. Advanced diagnostics
3. Empirical case studies
4. Interpretation and presentation of results

EMPIRICAL APPLICATIONS

Throughout the course, participants will work on empirical applications related to:

- regional innovation and knowledge creation;
- R&D collaboration networks;
- technology diffusion;
- electoral geography;
- regional economic performance.

Applications are based on real-world datasets and spatial networks.

SDM
 $PWY + XB + W$
 $\theta = 0$

SPATIAL PANEL DATA ECONOMETRICS USING *STATA*

SUGGESTED REFERENCES

- Anselin, L. (1988). Spatial econometrics: methods and models (Vol. 4). Springer Science & Business Media.
- LeSage, J., & Pace, R. K. (2009). Introduction to spatial econometrics. Chapman and Hall/CRC.
- Fischer, M. M., & Wang, J. (2011). Spatial data analysis: models, methods and techniques. Springer Science & Business Media.
- Elhorst, J. P. (2014). Spatial econometrics: from cross-sectional data to spatial panels (Vol. 479, p. 480). Heidelberg: Springer.
- Cameron, A. C. & Trivedi, P. K. (2022). *Microeconometrics Using Stata, Vol. I: Cross-Sectional and Panel Regression Methods*. Second Edition. *Stata Press*
- Cameron, A.C. & Trivedi, P. K. (2022). *Microeconometrics Using Stata, Vol II: Nonlinear Models and Causal Inference Methods*. Second Edition. *Stata Press*.

DATE AND LOCATION

The 2026 edition of this training course will be offered online on a part-time basis on the **14th-15th, 17th-18th of December** from 9:30am to 1pm, Central European Time (CET).

REGISTRATION FEES

Full-time Students*: € 460.00
Ph.D. Students: € 605.00
Academic: € 1100.00
Commercial: € 1480.00

*To be eligible for full-time student prices, participants must provide proof of their full-time student status for the current academic year. Our standard policy is to provide all **full-time students**, be they Undergraduates or Masters, access to our student registration rates. Part-time master and doctoral students on the other hand, who are also currently employed will however, be assigned the standard academic registration fee.

Fees are subject to VAT (applied at the current Italian rate of 22%). Under current EU fiscal regulations, VAT will not however applied to companies, Institutions or Universities providing a valid tax registration number.

The number of participants is limited to 8. Places will be allocated on a first come, first serve basis. The course will be officially confirmed, when at least 5 individuals are enrolled.

Participants will receive: i. lecture materials, *Stata* do-files developed specifically for the course, and a series of datasets and shapefiles to be used throughout the sessions; ii. a short course licence of *StataNow™* valid for 30 days. The course uses:

- *Stata's* official **sp** suite;
- spatial panel data commands;
- customized *do-files* and empirical applications.

Individuals interested in attending the training course, must return their completed registration forms to TStat by the **4th of December 2026**.

CONTACTS

Monica Gianni

TStat S.r.l. | Via Rettangolo, 12-14
I-67039 Sulmona (AQ)
T. +39 0864 210101

training@tstat.eu
www.tstat.eu
www.tstat.it

