

Time-Series Cross-Section Data Analysis

Time & place: **Friday** | 9.00-13.00 | Seminar Room 2

Dates: **20/01, 27/01, 10/02, 24/02, 10/03** (5 four-hour sessions)

Given by: **Filip Kostelka**, Chair in Political and Social Change

Administrative assistant: **Pia Dittmar** (pia.dittmar@eui.eu)

Course Description and Objectives

This seminar aims to introduce doctoral researchers to regression methods for longitudinal data, which are frequently used in comparative social science research and offer key analytical advantages over cross-sectional methods. While different types of longitudinal data will be presented (rolling cross-sections, panel data, etc.), the seminar will focus on time-series cross-sections (TSCS), consisting in a moderate number of units (e.g., countries, parties, etc.) observed over a moderate to large number of time points (years, months, etc.). The seminar will explain the pitfalls of TSCS analyses and equip doctoral researchers with a range of estimation strategies. It will present the properties and assumptions of the simple OLS, fixed effects, random effects, and first-difference estimators, and will introduce strategies to detect and deal with dynamic issues such as panel heteroscedasticity, serial correlation, contemporaneous correlation, and non-stationarity. The seminar will also delve into advanced topics such as hybrid estimators, and causal inference with TSCS data. The sessions will be practically orientated with emphasis on implementation in statistical software (STATA). The only prerequisites are the successful completion of an introductory class in quantitative research methods (Intermediate Quantitative Methods, or Introduction to Quantitative Methods), basic command of any statistical software, and strong motivation. To get credits for this class, doctoral researchers need to meet the departmental attendance requirements and submit a well-executed final assignment due after session 5.

Learning Outcomes

After having taken this class, doctoral researchers will know how to choose between different types of estimators and address temporal dependencies that may exist in TSCS data. They will be aware of the on-going methodological debates in the field of longitudinal data analysis. They will be able to manage and analyze TSCS data using statistical software. They will be ready for conducting longitudinal analyses meeting publication standards in leading social science journals.

Sessions (*The following reading list may be slightly updated before or even during the term!*)

1. Introduction: OLS & Longitudinal Data

Compulsory reading(s):

Section 1.3 “The Structure of Economic Data” in Wooldridge, Jeffrey M. 2010. *Introductory Econometrics the Modern Approach*. Cambridge: MIT Press, pp. 5-12.

Chapter 1 in Baltagi, Badi H. 2008. *Econometric Analysis of Panel Data*, Jon Wiley & Sons: Chichester.

Recommended reading(s):

Chapter 5 in Wooldridge, Jeffrey M (2015). *Introductory econometrics: A modern approach*, 4-6th

Edition. Nelson Education.

For a general overview on OLS: Chapters 2 to 9 in Wooldridge, Jeffrey M (2015). *Introductory econometrics: A modern approach*, 4-6th Edition. Nelson Education.

2. Unit Heterogeneity: FE, BE, and RE Estimators

Compulsory reading(s):

Wilson, S. E., & Butler, D. M. (2007). A Lot More to Do: The Sensitivity of Time-Series Cross-Section Analyses to Simple Alternative Specifications. *Political Analysis*, 15(2), 101–123.

Recommended reading(s):

Petersen, Trond. 2004. Analyzing panel data: Fixed and random effects models. Pp. 332-345 in Hardy, M. & Bryman, A. (eds) *Handbook of Data Analysis*. Sage. Chapter 14 in Wooldridge, Jeffrey M (2015). *Introductory econometrics: A modern approach*, 4-6th Edition. Nelson Education. Sections 10-10.6, 10.7.2-3 in Wooldridge, J. M. (2012). *Econometric analysis of cross section and panel data*. MIT Press.

3. Dynamic Issues 1: Serial & Contemporaneous Correlations, Heteroscedasticity

Compulsory reading(s):

Plümpert, Thomas, Vera E. Troeger, & Philip Manow. 2005. Panel Data Analysis in Comparative Politics: Linking Method to Theory. *European Journal of Political Research* 44 (2): 327–354. <https://doi.org/10.1111/j.1475-6765.2005.00230.x>

Recommended reading(s):

Beck, N. (2001). Time-Series-Cross-Section Data: What Have We Learned in the Past Few Years? *Annual Review of Political Science* 4(1), 271–293. <https://doi.org/10.1146/annurev.polisci.4.1.271>. Chapters 11-12 in Wooldridge, Jeffrey M (2015). *Introductory econometrics: A modern approach*, 4-6th Edition. Nelson Education.

4. Dynamic Issues 2: Non-Stationarity

Compulsory reading(s):

Ba, Y., Berrett J., and Coupet J. (2021). ‘Panel Data Analysis: A Guide for Nonprofit Studies’. *VOL-UNTAS: International Journal of Voluntary and Nonprofit Organizations*. <https://doi.org/10.1007/s11266-021-00342-w>.

Recommended reading(s):

Chapter 13 in Wooldridge, Jeffrey M (2015). *Introductory econometrics: A modern approach*, 4-6th Edition. Nelson Education. Sections 10.6 and 10.7.1 in Wooldridge, J. M. (2012). *Econometric analysis of cross section and panel data*. MIT Press.

5. Advanced Topics: Hybrid Estimators, Alternative Tests, Two-Way FEs

Compulsory reading(s):

Bell, A., Fairbrother, M., & Jones, K. (2019). Fixed and random effects models: making an informed choice. *Quality & quantity*, 53(2), 1051-1074.

Recommended reading(s):

Plümper, Thomas, and Vera E. Troeger. 2019. “Not so Harmless After All: The Fixed-Effects Model.” *Political Analysis* 27 (1): 21–45.

Chapter 5 in Angrist, J. D., and Jörn-Steffen Pischke. *Mostly Harmless Econometrics: An Empiricist’s Companion*. 1st ed. Princeton University Press, 2008.