Doctoral Program in Economics

UNIVERSITÀ DEGLI STUDI FIRENZE | UNIVERSITÀ DI SIENA | UNIVERSITÀ DI PISA

Academic year 2023/24

PANEL DATA ECONOMETRICS

Period: Second term, January and February 2024

Course hours: 20

Teachers: Silvia Tiezzi (10 hours, course coordinator), Federico Crudu (10 hours)

Exam methods:
written test: students will have to answer 2 questions (one on Module 1 and one on Module 2) out of a basket of 4 questions.

Prerequisites:
principles of statistics and econometrics; basic calculus and linear algebra

Module 1 - Introduction to Linear Panel Data Models (10 hours) – Prof. Tiezzi

Educational objectives
This part of Panel Data Econometrics will offer an *introduction to linear Panel Data models and estimation in a static environment*.
Class 1
Background and motivation for using panel data methods. Fixed effects panel data models.
Class 2
Random Effects models (REM). Testing Fixed and Random effects.
Class 3
Heteroskedasticity and Autocorrelation. The Hausman-Taylor (HT) IV estimator.
Class 4
Lab Session. We will estimate models with Fixed Effects, Random Effects and the HT estimator using STATA.
Class 5
Instrumental variables (IV)/generalized method of moments (GMM) estimation for Linear Panel Data Models with endogenous variables.

Bibliographical references
1. Greene, W. (2018) (8th Edition) *Econometric Analysis*, Prentice Hall International. Chapter 11 (Sections 11.2.1, 11.2.2, 11.2.4, 11.2.5, 11.3, 11.3.5, 11.4, 11.4.1, 11.4.2, 11.4.3, 11.5 (until 11.5.5), 11.6, 11.7, 11.8 (until 11.8.2)
or
2. Wooldridge, J. M. (2010) (Second Edition) *Econometric Analysis of Cross Sections and Panel Data*, MIT Press. Chapter 10.

Other suggested reading (optional)

Arellano, M. (2004) *Panel Data Econometrics*, Oxford University Press. Chapter 7.
Bond, S. (2002) *Dynamic panel data models: a guide to micro data methods and practice,* Portuguese Economic Journal, volume 1, pp. 141–162.

Module 2 - Generalised Method of Moments with Applications to Dynamic Panels (10 hours) – Prof. Crudu

Educational objectives
This module introduces M-estimation as a comprehensive approach to estimation and inference with GMM and IV as special cases. Applications will focus on dynamic panel data models.

Class 1
Preliminary concepts. Definition of M-estimator and basic asymptotic properties.
Class 2
Two step estimation and inference. GMM and IV estimators.
Class 3
Pitfalls of the FE estimator in the context of dynamic panel data models and the IV approach.
Class 4
Estimation and inference of dynamic panel data models I.
Class 5
Estimation and inference of dynamic panel data models II.

Bibliographical references
1. Amemiya, T. (1985) *Advanced Econometrics*, Blackwell. Chapters 3 and 4.

2. Arellano M. (2004) *Panel Data Econometrics*, Oxford University Press. Chapters 7 and 8.

2. Hansen, B. E. (2020) *Econometrics*, Princeton University Press. Chapters 2, 6, 13, 17, 22.

3. Wooldridge, J. M. (2010) (Second Edition) *Econometric Analysis of Cross Sections and Panel Data*, MIT Press. Chapters 2, 3, 12, 14.