Doctoral Program in Economics

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

Academic year 2021/22

PANEL DATA ECONOMETRICS

Period:

Second term: February 2022

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 estimation techniques in a static environment*.

Class 1

Background and motivation for using panel data methods.

Fixed effects panel data models: the Pooled Ordinary Least Squares (OLS) estimator; the Within-Groups (WG) estimator; the Least Squares Dummy Variable (LSDV) estimator.

Class 2

Random Effects models (REM): Generalised Least Squares (GLS) estimator; Breusch-Pagan Lagrange Multiplier misspecification test; Hausman specification Test for comparing the random effects estimator with the fixed effects estimator; Heteroskedasticity and robust covariance estimation; Autocorrelation.

Class 3

We will look at the random effects model where some of the RHS regressors are correlated with the individual effects and study 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. (2017) (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.

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

IV estimation of dynamic panel data models I.

Class 5

IV estimation of dynamic panel data models II.

Bibliographical references

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

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

3. Hansen, B. E. (2020) *Econometrics*, https://www.ssc.wisc.edu/~bhansen/econometrics/. Chapters 2, 6, 13, 17, 22.