IQS School of Management
UNIVERSITAT RAMON LLULL

CETIS - PhD TRANSVERSAL TRAINING ACTIVITY

Basic information of the PhD Training Activity	
Title	Panel Data Analysis
Professor	Octasiano Miguel Valerio Mendoza & Mihály Tamás Borsi
Character	Transversal
Type of activity	Compulsory
Hours of class time	10h + 12h
PhD student level	1st year students ☒ 2nd year students ☐ 3rd year students ☐
Teaching	Face-to-face ☐ Face-to-face and online ☒
Semester	2
Goals	The primary goal of this training activity is to equip doctoral students with the foundational knowledge and skills required to effectively utilize statistical techniques in their research, particularly focusing on panel data and causal inference. This involves: - Understanding the theoretical underpinnings of the standard, most commonly used quantitative methods. - Gaining practical experience in applying these methods using the statistical software STATA. In terms of learning goals, by the end of the module, students are expected to: - Comprehend the conceptual foundations for panel data research methods. - Learn how to sample, collect, and process panel data. - Design and conduct causal analyses using alternative approaches. - Understand the limitations and advantages of various panel data research methods, with a particular emphasis on causal inference.

Contents	The course is structured over six sessions, each focusing on different aspects of panel data analysis and causal inference:
	
	1. **Introduction to Panel Data**
	   - Theory and setup of panel data.
	   - Variations in panel data and processing using STATA.
	
	2. **Panel Data Models**
	   - Pooled and first difference estimators.
	   - Fixed effects and random effects estimators.
	
	3. **Panel Data Analysis**
	   - Detailed panel data setup.
	   - Pooled and first difference estimators.
	
	4. **A Framework for Causal Analysis**
	   - Potential outcomes framework and causal maps.
	   - Treatment evaluation and sources of variation.
	   - Case study: Food and health.

5. **Controlled Experiments**
    - Designing and implementing controlled experiments.
    - Randomization, covariates, and limitations
    - Internal and external validity.
    - Case studies: Working from home and employee performance

    Regression analysis and matching with observational data
    - Conditioning on confounders
    - Propensity score matching
    - Case study: Founder/family ownership and quality of management.

6. **Causal Inference: Difference in Differences (DiD)**
    - Difference-in-difference models
    - Case study: How does a merger between airlines affect prices?

Literature:

Baltagi, Badi H. (2021): Econometrics, Sixth edition, Springer

Békés, G., Kézdi, G. (2021): Data Analysis for Business Economics and Policy, Cambridge University Press.

Hansen, Bruce E. (2022): Econometrics, Princeton University Press.

Llaudet, E., Imai, K. (2023): Data analysis for social science: A friendly and practical introduction. Princeton University Press.

Learning outcomes

The specific learning outcomes are detailed as follows:

- **Conceptual Understanding:** Students will understand the theoretical concepts behind panel data research methods, including the ability to identify and differentiate between various estimators (pooled, first difference, fixed effects, random effects).

- **Data Handling Skills:** Students will develop practical skills in sampling, collecting, and processing panel data using STATA, enabling them to handle real-world data efficiently.

- **Critical Evaluation:** Students will be able to critically evaluate the advantages and limitations of different panel data methods, enhancing their ability to choose the appropriate methods for their research questions.

- **Causal Analysis Proficiency:** Students will gain the capability to conduct causal analyses, using frameworks such as potential outcomes, controlled experiments, and difference-in-difference models, and apply these methods to their own research.

Language	English

Assessment

The evaluation of this training activity is based on a continuous assessment approach: the evaluation is structured around practical assignments, case study analyses, and in-class participation. The specific assessments for this course include:

Practical Assignments:

- Data Processing and Analysis: Regular assignments where students are given datasets and required to apply various panel data techniques using STATA.

- Problem-solving questions that require the application of statistical techniques discussed in class.

Case Study Analysis:

- Detailed analysis of provided case studies such as the impact of food and health interventions, employee performance while working from home, and the effect of airline mergers on prices. Students are required to choose appropriate methods to study research questions, analyze the data, and interpret results.

In-class Activities and Presentations:

- Interactive quizzes covering theoretical aspects of panel data models.

- Students present their findings and methodological approaches to the class, promoting peer learning and critical discussion.

- Active participation in class discussions and engagement with assigned readings.

By integrating these assessments, students will be able to demonstrate their theoretical understanding, practical skills, and critical thinking abilities in the field of panel data analysis and causal inference.

Mobility requisites

NA