

**Mohamed Khidher University**

Faculty of economics, Commercial & Management Sciences  
Department of commerce

Academic year 2024/2025 second semester

Teacher: Prof. GUECHARI Yasmina

# **Advanced Econometrics Teaching Unit**

## **Canvas**

### **Unit Objective:**

- Understand the basics of panel data and its significance in econometric modeling.
- Learn how to differentiate between static and dynamic panel data models.
- Gain practical experience in applying econometric techniques using statistical software.

### **PREREQUISITES:**

Here are some common prerequisites that students might benefit from having before diving into a time series analysis module:

- Basic Statistics:** Understanding of fundamental statistical concepts such as mean, median, standard deviation, and variance. Familiarity with probability distributions and statistical inference.
- Mathematics:** Comfort with basic mathematical concepts, including algebra and calculus. Understanding of mathematical notation commonly used in statistics and time series analysis.
- Software Skills:** Basic excel skills, including tasks such as data entry, basic formula usage, cell formatting, and simple data analysis. This is a common requirement in various professional settings where Excel is frequently used for managing and analyzing data.

### **DURATION:**

12 WEEKS

### **OUTLINES**

#### **Section 1: Nonlinear Models**

**Week 1:** Generalities about nonlinear models

- Definition
- Key characteristic
- structural fractures

**Week 2:** Nonlinear and nonlinearizable models and methods for estimating their parameters

## **Section 2 : Econometric Modeling of Qualitative Variables**

**Week 3:** Understanding and Applying the Logit Model

- Introduction to qualitative variables
- Definition and applications of the Logit Model

**Week 4:** Understanding and Applying the Probit Model

- Differences between Logit and Probit models
- Practical examples of Probit model applications

## **Section 3: Introduction to Panel Data Analysis**

**Week 5:** Basics of Panel Data

- Definition of panel data
- Key features and advantages of using panel data

**Week 6:** Static Panel Data Models

- Overview of Pooled Regression Model (PRM)
- Introduction to Fixed Effects Model (FEM)
- Introduction to Random Effects Model (REM)

## **Section 4: Advanced Topics in Panel Data Analysis**

**Week 7:** Stability in Panel Data Models

- Concepts of stability testing
- Introduction to First Generation Tests

**Week 8:** Cointegration in Panel Data

- Basics of panel data cointegration
- Introduction to Pedroni and Kao Tests

**Week 9:** Dynamic Panel Data Models

- Differences between static and dynamic models

- Overview of PARDL and NARDL models

## **Section 5: Practical Applications Using Statistical Software**

### **Week 10: Applying Logit and Probit Models**

- Hands-on examples using statistical software

### **Week 11: Panel Data Analysis Basics**

- Cointegration tests in panel data using software

### **Week 12: Advanced Panel Data Models in Practice**

- Applying PARDL and NARDL models