Lecture 0: Class Setup

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FGV EPGE

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Course Information

- **Course**: Econometrics I (Part I);
- **Instructor**: Raul Guarini Riva — `raul.riva@fgv.br`;
- **Teaching Assistant**: Taric Latif — `tariclatif@gmail.com`;
- **Class Schedule**: Tuesdays and Thursdays, 11:00–13:00;
- **Office Hours**: Fridays, 9:00-10:00;
- **TA Session Schedule**: check with Taric;
- GitHub repository:
  https://github.com/epge-classes/econometrics-fgv-2025
- After class, you should review the online syllabus in detail;

  We will use Github for course materials, assignments, and so on.

Why Should You Take This Class Seriously?

- Most students will engage in empirical research across diverse fields of Economics:
  - Labor, Development, Urban, Finance, Health, IO, even Macro...!
  - Obviously important if you want to do Econometrics;
- So far, most of what you learned is about **cross-sectional data** and **OLS**;
- We go beyond cross-sectional data to tackle: **Time Series** and **Panel Data**;
- Time Series data is your bread and butter in Macro, Finance, and many other fields;
- Panel Data methods (fixed effects, diff-in-diff, ...) are everywhere in empirical research;
- We will also cover a bit of non-parametric methods and bootstrap techniques;

Learning Goals (by Week 5)

After the first half of the course, you should be able to:

1. Understand and implement non-parametric kernel-based methods;

2. Apply bootstrap methods for i.i.d. data;

3. Analyze time series data:
   - Concepts: stationarity, ergodicity, persistence, autocorrelation, ...
   - Estimation and forecasting with ARMA models;
   - Asymptotic distribution of the OLS estimator under autocorrelation;

4. Implement GMM estimation under heteroskedasticity and autocorrelation;
   - Super relevant for Panel Data methods;
   - Also very useful to estimate structural models;

Books? Slides?

- I will provide slides for the lectures;

- These slides will be mostly based on two books $+$ a famous reference here and there:
  - **Econometrics**, by Bruce Hansen (hello, old friend!);
  - **Time Series Analysis**, by James Hamilton (very comprehensive, also very long);
  - **Stochastic Limit Theory**, by James Davidson (seriously dark magic)

- I will highlight the recommended readings in the slides, and reading the books is **mandatory**.

- Slides are not a substitute for reading the books;

- I will make slides available on Github just before class;

Tentative Weekly Topics

- **Week 1:** Non-parametric estimation $+$ Bootstrap for i.i.d. data;
- **Week 2:**
  - The structure of time series data, stationarity, ergodicity, persistence, autocorrelation, ...;
  - ARMA models $+$ the Box-Jenkins methodology $+$ Wold Decomposition;
- **Week 3:**
  - Estimation of ARMA models, MLE estimators...
  - LLN's and CLT's for dependent data – focus on using the results;
- **Week 4:**
  - LLN and CLT's for dependent data – focus on using the results rather than proving every single little thing;
  - Intro to GMM;
- **Week 5:**
  - GMM asymptotic theory;
  - GMM and HAC estimation $+$ numerical pitfalls;

Evaluation and Grades

- Grades for the first and second half of the class are independent;
- Final grade $= 0.5 \times$ (Grade on Part I) $+ 0.5 \times$ (Grade on Part II);
- The first part has 3 problem sets and 1 exam:

$$\text{Grade on Part I} = \frac{1}{9} \times \text{PS1} + \frac{1}{9} \times \text{PS2} + \frac{1}{9} \times \text{PS3} + \frac{2}{3} \times \text{Exam} \qquad (1)$$

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- There will one private repository for each group and each problem set;

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- You should deliver both a report answering the questions and the code used to generate the results;
- Feel free to use any civilized programming language (Python, R, Julia, Matlab, ...);
- No, you cannot use Stata or pre-packaged solutions in any of the languages above – details will be provided in the problem sets;

Attendance

- It is not mandatory at all – you are adults;
- However, if you come, you have to be on time;
- 10-minute grace period – after that, you will not be allowed to enter the classroom;

Questions?

One more thing...

This is really important!

- This is the first time I teach this class;
- I need ongoing feedback;
- Is there something great about? Tell me! If there something terrible about it? Also tell me!
- Don't be shy – negative feedback will never be punished in any way;
- If anything, on the contrary!