Syllabus – PhD Course Proposal

Course Title:

Time series econometrics

Instructor:

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Course Description:

This course provides an introduction to the key characteristics of time series data and the econometric models designed to address them, with a focus on single-equation frameworks. Central concepts such as autocorrelation and stationarity are thoroughly examined. The course also explores the conditions under which the Ordinary Least Squares (OLS) estimator remains consistent in a time series context, including the properties of the variance-covariance matrix.

Students will be introduced to analytical tools like dynamic multipliers, which are derived and discussed with practical applications in mind. A particular emphasis is placed on understanding the implications of using data with a time dimension—both in purely time series settings and in long panel data, where the time component plays a critical role.

The course aims to equip PhD students with the foundational knowledge necessary for econometric modelling involving time-dependent data. By the end of the course, students will be able to critically engage with research based on time series and long panel data, and will have the skills to conduct their own empirical analyses in these areas.

Learning Outcomes:

At the end of the course, students will be able to:

1. understand how autocorrelation and non-stationarity require specific econometric models;

2. use time-series models for real-world analysis;

3. apply the concepts taught in different fields.

Prerequisites:

While not strictly required, a basic understanding of econometrics—particularly cross-sectional analysis and the conditions for the unbiasedness and consistency of the OLS estimator—will be helpful for grasping the concepts covered in this course.

Course Structure and Schedule (15 hours):

Session	Topic	Key Readings
1	• Scalar, vector and matrix notation of the linear regression model. • Matrix form of the OLS estimator. • Properties of time series data.	Instructor's notes
2	• Estimation of the linear regression model with stationary variables. • HAC standard errors.	Instructor's notes
3	• Tools for the analysis: dynamic multipliers, squared regressors, dummy variables, interactions and index numbers.	Instructor's notes
4	• Non-stationary variables. • Deterministic trends • Stochastic trends	Instructor's notes
5	• Testing for stationarity • Spurious regressions • The time dimension in Panel data	Instructor's notes

Teaching Methods:

Lectures.

Assessment:

Written exam.

Bibliography:

Verbeek, M. (2017), A guide to modern econometrics, Wiley

Wooldridge, J. (2020), Introductory econometrics, 7th ed., Cengage

Preferred Bimester:

Select one: May–June