

Macroeconometrics

340.735

Professor Luis B. Marques

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Instructor:

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Office hours: Wednesday, 2:00 p.m. - 5:00 p.m. BOB 709.

T.A.: to be announced.

Course Description:

The goal of this course is to discuss and apply the techniques used in time series econometrics applied to macroeconomics and financial markets, always from a practitioner's point of view. This is achieved by providing a comprehensive set of tools and techniques for analyzing various forms of univariate and multivariate time series and by showing how to use EVIEWS and STATA to estimate macroeconomic and financial time series models. Through extensive use of computers, students will have the opportunity to apply in class every technique learned. The course is aimed at students who would like to pursue a career in macroeconomic policy analysis or financial markets forecasting and for whom grasping concepts like stationarity, cointegration, causality or changing volatility will be extremely valuable.

These are the topics to be covered:

1. Stationary Univariate Models: ARMA models and Box-Jenkins methodology, Model Selection, Forecasting methodology.
2. Nonstationary Univariate Models: Trend/Cycle decomposition, Beveridge-Nelson decomposition, Deterministic and stochastic trend models, Unit root tests, Stationarity tests.
3. Stationary Multivariate Models: Dynamic simultaneous equations models, Vector autoregression (VAR) models, Granger causality, Impulse response functions, Variance decompositions, Structural VAR models.
4. Nonstationary Multivariate Models: Spurious regression, Cointegration, Vector error correction models (VECMs), Testing for cointegration.
5. Models of Changing Volatility: univariate and multivariate GARCH models.
6. Estimation, Inference, and Simulation in Structural Macroeconomic Models: GMM and calibration.

Prerequisite:

Econometrics. Knowledge of linear algebra and calculus, as well as proficiency with

computers, is highly recommended.

Evaluation:

Course evaluation is based on one take-home exam and one assignment where you are to replicate the results of a published research article. The exam is worth 50% of the final grade. The date for the exam is final and no exceptions will be allowed (except medical reasons - which must be documented by your doctor, within a week of the exam - and SAIS related travel). You are supposed to do all assignments on your own.

I expect you to conduct all activities in accordance to the rules of SAIS' Honor Code (refer to the Red Book).

Readings and Textbook:

I will follow for the foundations of the course the book by Chris Brooks, **Introductory Econometrics for Finance**, 2nd Edition, 2008, Crambridge University Press (Paperback edition). Other materials which can be used as additional references are: **Applied econometric Time Series** by Walter Enders (2nd Edition, 2000), **Econometric Methods** by Jack Johnston and John Dinardo (4th Edition, 1997), **Time Series Analysis** by James D. Hamilton, **The Econometrics of Financial Markets** by John Y. Campbell, Andrew W. Lo, A. Craig MacKinlay, **Structural Macroeconometrics** by David N. DeJong (with Chatan Dave) and **Methods for Applied Macroeconomic Research** by Fabio Canova. A series of applied articles will be covered in class and used as basis for applied work by students.

Temptative Course Outline:

- **Class 1** Mathematical preliminaries. Estimation Methods. Overview of inference in the classical model.
- **Class 2** Autocorrelation and Heteroskedasticity in the Linear Regression Model.
- **Class 3** Stationary Univariate Time Series Models. ARMA models.
- **Class 4** Stationary Univariate Time Series Models. Forecasting.
- **Class 5** Nonstationary Univariate Time Series Models. ARIMA models.
- **Class 6** Nonstationary Univariate Time Series Models. Unit root testing.
- **Class 7** Multivariate Time Series. Simultaneous Equation Models.
- **Class 8** Multivariate Time Series. VAR Models (I).
- **Class 9** Multivariate Time Series. VAR Models (II).
- **Class 10** Cointegration. VECM models.

- **Class 11** Cointegration. Testing.
- **Class 12** Modelling volatility. GARCH models.
- **Class 13** Modelling volatility. Extensions.