Department of Economics

Stockholm University

Syllabus

for course at advanced level

Econometrics 3b: Time Series Data
Ekonometri 3b: Tidsseriedata

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	EC7413
Valid from:	Autumn 2013
Date of approval:	2013-05-23
Department	Department of Economics
Subject	Economics
Specialisation:	A1F - Second cycle, has second-cycle course/s as entry requirements

Decision

This syllabus was approved by the Board of the Department of Economics on May 23, 2013.

Prerequisites and special admittance requirements

Admission to this course requires that the student is either (1) enrolled in the Master's Programme in Economics at Stockholm University or the Master's Programme in Banking and Finance, or (2) has (a) eligibility for the Master's Programme in Economics at Stockholm University, and (b) prerequisites equal to the mandatory courses that have been given prior to this course according to the current curriculum for the Master's Programme in Economics.

Course structure

Examination code	Name	Higher Education Credits
741A	Econometrics 3b: Time Series Data	7.5

Course content

This course introduces students to the basic knowledge and tools needed for the statistical analysis of time series data. The course is a mixture of lectures and exercises in the computer lab together with the instructor, with a strong emphasis on learning by doing. After completing this course, students should be able to continue studying time series analysis at the level of a second-year graduate course or begin working with analysis of time series data for a company or government agency.

Learning outcomes

The two main aims of this course are:

• Upon completion of the course, students are expected to be able to formulate and test a hypothesis using time series data

• Students completing this course should be able to read, understand and critically review an empirical report which uses time series data.

The course is split into two parts, (1) univariate time series models and (2) multivariate time series models. The specific aims of each part are:

Part 1 – univariate time series models:

After completing part 1 of this course, students should be able to

• define the following univariate time series models; MA, AR, random walk, random walk with drift, ARMA and ARIMA models.

• explain what stationary, trend stationary and difference stationary processes are.

• use the most common methods for analysing both long-run and seasonal trends in time series data.

• apply the Box-Jenkins method to construct a forecast of a univariate time series and evaluate the estimated model and the predictions it produces.

• discuss both the strengths and weaknesses of the univariate time series methods studied in part 1 of this course.

Part 2 – multivariate time series models:

After completing part 2 of this course, students should be able to

• define the following multivariate time series models; autoregressive distributed lag (ADL), error-correction (EC), vector autoregression (VAR) and vector error-correction (VEC) models.

• explain what a "spurious" regression is and what cointegration is as well as discuss why these two concepts are particularly important for time series analysis.

• explain what Granger causality is and test for its existence between two time series variables.

• construct and estimate a multivariate time series model.

• interpret the results produced by a multivariate time series model.

• discuss the strengths and weaknesses of the multivariate time series methods presented in this part of the course.

Education

Instruction will be in the form of lectures and hands-on exercises in the computer lab. The course will be in English.

Forms of examination

The examination consists of three parts:

• compulsory hand-in assignments,

• research outline (similar to a term paper),

• computer lab examination.

Grades will be set according to a 7-tier goal related scale. Passing grades include grades A, B, C, D, E, where A is the highest and E is the lowest. Failing grades include F and FX. Grade F is lower than grade FX.

Grading criteria:

A = B + evaluate time series methodology; lead a critical discussion concerning time series data and time series methods; formulate and test time series hypotheses in an independent manner.

B = C + interpret results from time series models and run diagnostic tests on time series

C = D + apply fundamental concepts and time series models to economic questions.

D = E + explain and give examples of fundamental concepts and time series models.

E = define fundamental concepts and time series models.

Grade FX means that the student has not handed in at least one of the required hand-in assignments. Once all the required homework assignments have been handed in, the student will be awarded a new grade, A to F, in accordance with the grading scale outlined above.

Students receiving a final grade of F may retake the computer lab examination as many times as is necessary for them to obtain at least grade E. One regular computer lab examination and one re-take will be scheduled per academic year.

The final course grade will be calculated as the sum of the grades received on the research outline and on the computer lab examination. The grades F – A (excluding FX) are worth 0 – 5 points, which allows for a maximum of 10 points. Final grades will be awarded as follows: A = 9-10, B = 7-8, C = 5-6, D = 3-4, E = 1-2, FX = at least one homework assignment or in-class presentation not completed, F = 0.

Interim

In the event that this course is no longer offered in the course programme, students will have at least three opportunities to re-take the computer lab exam, once each semester in the three semesters after the course was last given.

Required reading

See course homepage available from www.ne.su.se.