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:	Spring 2023
Date of approval:	2013-05-23
Changed:	2022-09-01
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 September 1, 2022.

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
741B	Assignments	2
741C	Pre-seminar	0.5
741D	Course Essay	5

Course content

The course aims to reach a deeper understanding of the statistical methods needed to empirically analyze economic problems involving time series data. The course includes; OLS with time series data; the autocorrelation concept; deterministic trend; season; structural breaches; inference robust to heteroscedasticity and autocorrelation; ARMA models, stationarity and stochastic trend; test for unit roots; test for stationarity; autoregressive models; maximum-likelihood estimation; information criteria and moving average models; SARIMA models; VAR models; cointegration and error correction models; forecasting, forecast evaluation and Granger causality. The course includes an introduction to R and reproducible econometrics.

Learning outcomes

After completing the course, the student should be able to

* carry out trend and seasonal cleaning of time series data without and with structural breaks,

* carry out tests for unit root/stationarity and make the data stationary through appropriate variable transformation,

* estimate a time series model with OLS and carry out hypothesis testing (t- and F- test) with robust

inference,

* identify, estimate and diagnose ARIMA and multivariate VAR models,

* test for cointegration in a multivariate model and estimate and analyze error correction models,

* using models reviewed during the course make forecasts and evaluate them, and

* use the econometrics program R to create reproducible econometrics.

Education
Lectures and exercises. The language of instruction is English.

Forms of examination
Assignments are solved in groups of 1–3 students, oral presentation of the own term paper's question, data and methods at a pre-seminar and to individually write a term paper with a self-selected question, the purpose
of which is to analyze the econometric methods reviewed during the course.

Assignments comprising 2 higher education credits are carried out in groups and are examined with the grades fail (U) or pass (G). For G, all submissions must be approved.

Oral presentation in a pre-seminar comprising 0.5 higher education credits
is carried out individually and examined with the grades fail (U) or pass (G). For G, the discussion must be completed and approved.

A term paper worth 5 higher education credits is written individually and examined according to a sevenpoint
scale related to the learning objectives of the course: Passing grades are A, B, C, D, and E, where A is the highest grade and E the lowest. Failing grades are F and FX, where F is lower than FX.

Grading criteria (regression analysis below refers to the different regression methods that are listed under the
section Course content):

A (Excellent): The student can formulate and test a hypotheses with time series data with very great skill and critically review and analyze an empirical report with time series data with very great skill.

B (Very Good): The student can formulate and test a hypotheses with time series data with great skill and critically review and analyze an empirical report with time series data with great skill.

C (Good): The student can formulate and test a hypotheses with time series data with skill and critically review and analyze an empirical report with time series data with skill.

D (Satisfactory): The student can formulate and test a hypotheses with time series data and critically review and analyze an empirical report with time series data.

E (Adequate): The student can largely formulate and test a hypotheses with time series data and largely critically review and analyze an empirical report with time series data.

FX (Inadequate)/F (Totally inadequate): The requirements for E are not fulfilled, where FX is marginally better than F.

The final course grade is given according to the sevenpoint scale grading system and set according to the grade on the course essay when the assignments and the pre-seminar are both examined with a passing grade.

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 exams, once each semester in the three semesters after the course was last given.

Limitations
This course may not be included in a degree together with EC7404- Econometrics 2b: Time Series Data.

Misc

The course is also included in the subject of econometrics.

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