University of St.Gallen

Course and Examination Fact Sheet: Spring Semester 2019

10,370: Time Series Analysis - Advanced Methods

ECTS credits: 4

Overview examination/s

(binding regulations see below)
Decentral - Written examination (75%)
Decentral - Active participation (25%)

Attached courses

Timetable -- Language -- Lecturer
10,370,1.00 Time Series Analysis - Advanced Methods -- Englisch -- Trenkler Carsten

Course information

Course prerequisites

Course participants should have advanced knowledge in econometrics and a solid knowledge of univariate time series analysis is required. Students without knowledge in univariate time series are discouraged to take this class.

Hardware: Laptops would be helpful if no computer lab can be used.

Software: For the illustrations and the computer tutorials I plan to use the program JMulTi which can be downloaded free of charge at www.jmulti.com.

Course content

The course is designed to equip students at the PhD-level with the appropriate knowledge of multiple time series methods needed to conduct empirical research in time series economics and macroeconomics. We will cover modern time series methods such as vector autoregressions (VARs), including structural VARs, cointegration analysis and vector error models (VECM) as well as VARMA modelling. Moreover, we deal with relevant bootstrap methods. We discuss model fitting, estimation and diagnostic and explain the use of the models for forecasting and impulse response analysis. The course contains theory sessions, taught in a standard lecture format and tutored (computer) sessions, during which the participants have the opportunity to apply the econometric methods and concepts. Participants should present solutions to exercise questions in the tutorial sessions as part of the examination requirements.

Course structure

Tentative schedule

Day 1

1. Introduction and Overview
2. Reduced Form VAR Analysis

    2.1. Model framework: stable VARs

    2.2. Estimation

    2.3. Model selection and diagnostic

    2.4. Forecasting

    2.5. Granger-Predictability

Day 2

3. Cointegration and VEC Models

   3.1. Introduction to non-stationationary time series analysis

   3.2. Engle-Granger two-step approach

   3.3. VEC Models

   3.4. Estimation of VECMs

   3.5. Specification of VECMs

   Day 3

4. Bootstrap Methods for Time Series Models

   4.1. Introduction

   4.2. Bootstrap Schemes

   4.3. Bootstrap Tests

   4.4. Bootstrap Confidence Intervals

   Day 4

5. Structural VAR Analysis

   5.1. Impulse response analysis

   5.2. Forecast error variance decompositions

   5.3. The AB-model

   5.4. Identification by sign restrictions

   5.5. Identification by heteroskedasticity

   5.6. Long-run restrictions and structural VECMs

   Day 5

6. VARMA models

6.1. Introduction

6.2. Identification problem

6.3. Estimation, specification, and application of final and diagonal MA forms

Course literature

Mandatory

Lütkepohl (2005, Chs. 1-4, 6-9, 11-13, Appendix D.3), New Introduction to Multiple Time Series Analysis, Springer, Berlin

Cameron, A.C. and Trivedi, P.K. (2005, Ch. 11), Microeconometrics: Methods and Applications, Cambridge University Press

Kilian, L. and Lütkepohl, H. (2017, Ch. 12), Structural Vector Autoregressive Analysis, Cambridge University Press [available at Lutz Kilian's webpage]

Dufour, J.-M. and Pelletier, D. (2014), Practical methods for modelling weak VARMA processes: Identification, estimation and specification with a macroeconomic application. Discussion Paper, McGill University, CIREQ and CIRANO

Supplementary / voluntary

Enders, W. (2004, Chs. 4-6), Applied Econometric Time Series, 2nd ed., Wiley.

Kilian, L. and Lütkepohl, H. (2017), Structural Vector Autoregressive Analysis, Cambridge University Press [available at Lutz Kilian's webpage]

Lütkepohl, H. and Krätzig, M. (2004, Chs. 2-4), Applied Time Series Econometrics, Cambridge University Press

Mandatory readings before course start:

At least Chapters 1 and 2 of Lütkepohl (2005), ideally also Chapters 3 and 4. For a more concise introduction students may alternatively consult Chapter 2 of Kilian and Lütkepohl (forthcoming) or for a more applied introduction I refer to Chapters 3 and 4 of Lütkepohl, H. and Krätzig, M. (2004).

Additional course information

Only for PhD students of the University of St.Gallen

PEF students may register via regular bidding for the courses offered together by PEF and Global School in Empirical Research Methods (GSERM). Enrolment in a course is binding: students have to attend the course and take the exam. The credits will be shown on the scorecard.

All other PhD students should register for the courses offered by Global School in Empirical Research Methods (GSERM), **both via bidding and via GSERM** for:

- courses for the curriculum and

- optional courses **with** an examination. These will be listed on the scorecard under optional work (**only possible if all required elective courses have already been completed**).

Please register **only via GSERM** for:

- optional courses **without** an examination and

- optional courses **if not all required elective courses have been completed** (not shown on the scorecard)

The registration via GSERM can only be made starting **March 1st 2019**. Earlier registrations have to be kept pending and will not be confirmed.

Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form
Decentral - Written examination (75%)

Remark
take-home exam

Examination-aid rule
Open Book
Students are free to choose aids but will have to comply with the following restrictions:

- At such examinations, all the pocket calculators of the Texas Instruments **TI-30 series** are admissible. Any other pocket calculator models are inadmissible.
- In addition, any type of communication, as well as any electronic devices that can be programmed and are capable of communication such as electronic dictionaries, notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids
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Examination languages
Question language: English
Answer language: English

2. Examination sub part (2/2)

Examination time and form
Decentral - Active participation (25%)

Remark
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Examination-aid rule
Practical examination
No examination-aid rule is necessary for such examination types. The rules and regulations of the University of St. Gallen apply in a subsidiary fashion.

Supplementary aids
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Examination languages
Question language: English
Answer language: English

Examination content

The exam is: take-home exam (75%) and oral participation in the course and presentation of solutions to exercise questions in tutorial sessions (25%).

The following topics are relevant for the examination.

Reduced Form VAR model and its use for forecasting and Granger- predictability testing; the VEC model; structural VAR analysis (except sections 5.4 and 5.5) and the use of the bootstrap for producing confidence intervals.

Examination relevant literature

The relevant literature for the exam is:

Lütkepohl (2005, Chs. 1-4, 6-9, Appendix D.3), New Introduction to Multiple Time Series Analysis, Springer, Berlin

Kilian, L. and Lütkepohl, H. (2017, Ch. 12), Structural Vector Autoregressive Analysis, Cambridge University Press [available at Lutz Kilian's webpage]

The supplementary literature is:

Cameron, A.C. and Trivedi, P.K. (2005, Ch. 11), Microeconometrics: Methods and Applications, Cambridge University Press

Lütkepohl, H. and Krätzig, M. (2004, Chs. 2-4), Applied Time Series Econometrics, Cambridge University Press

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Please note

We would like to point out to you that this fact sheet has absolute priority over other information such as StudyNet, faculty members' personal databases, information provided in lectures, etc.When will the fact sheets become binding?

- Information about courses and examination time (central/decentral and grading form): from the start of the bidding process on 24 January 2019
- Information about decentral examinations (examination-aid rule, examination content, examination relevant literature): after the 4th semester week on 18 March 2019
- Information about central examinations (examination-aid rule, examination content, examination relevant literature): from the start of the enrolment period for the examinations on 08 April 2019

Please look at the fact sheet once more after these deadlines have expired.