University of St.Gallen

Course and Examination Fact Sheet: Spring Semester 2019

10,378: Resampling Methods and Forecasting

ECTS credits: 4

Overview examination/s
(binding regulations see below)
Decentral - Oral examination (individual) (100%)

Attached courses
Timetable -- Language -- Lecturer
10,378,1.00 Resampling Methods and Forecasting -- Englisch -- Camponovo Lorenzo

Course information

Course prerequisites
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Course content

The course consists of two parts. In the first part we introduce standard and more recent resampling methods developed for dealing with dependent data. In the second part we first show how to implement these techniques for forecasting time series in linear and nonlinear models. Finally, we study their accuracy in finance applications.

After reviewing the standard bootstrap for the iid case, in the first part of the course we show how to introduce consistent resampling methods for time series. We first focus on fully nonparametric resampling procedures such as block bootstrap, stationary bootstrap and subsampling methods. Then, we also introduce more complex parametric bootstrap procedures such as residual bootstrap, implied probability bootstrap and Markov bootstrap methods. We highlight the differences of these procedures and study their accuracy through Monte Carlo simulations. Finally, we prove their consistency and show the asymptotic refinements over the standard asymptotic theory.

In the second part of the course we show how to implement these techniques for forecasting time series. To this end, we consider both linear and nonlinear models. Through Monte Carlo simulations we study the accuracy of the different methods in different contexts. Finally, finance applications are also analyzed. In particular, we consider some recent studies on the application of bootstrap methods for forecasting Value at Risk (VaR) and realized volatility.

Course structure

Part 1: Resampling Methods for Time Series.

Chapter (1): The iid Bootstrap.

Chapter (2): Nonparametric Bootstrap for Time Series.

Chapter (3): Parametric Bootstrap for Time Series.

Chapter (4): Consistency and Asymptotic Refinements.

Part 2: Forecasting Time Series.

Chapter (5): Prediction Time Series.

Chapter (6): Resampling Methods and Forecasting.

Chapter (7): Finance Application: Value at Risk (VaR).

Chapter (8): Finance Application: Realized Volatility.

Course literature

For each chapter of the first and second part of the course, we provide a list of references with some of the more recent studies on resampling methods and forecasting for time series. Moreover, following books may provide a valid overview on the topics of the course.

[1] Brockwell, P.J., and R.A. Davis, 1996. Introduction to Time Series and Forecasting. Springer-Verlag, New York.

[2] Efron, B., and R.J. Tibshirani, 1993. An Introduction to the Bootstrap. Chapman & Hall, New York.

[3] Davison, A.C., and D.V. Hinkley, 1997. Bootstrap Methods and Their Application. Cambridge University Press.

[4] Hall, P., 1992. The Bootstrap and Edgeworth Expansion. Springer-Verlag, New York.

[5] Politis, D.N., Romano J.P., and M. Wolf, 1999. Subsampling. Springer-Verlag, New York.

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 (1/1)

Examination time and form
Decentral - Oral examination (individual) (100%)

Remark
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Examination-aid rule
Extended Closed Book

University of St.Gallen

The use of aids is limited; any additional aids permitted are exhaustively listed under "Supplementary aids". Basically, the following is applicable:

- At such examinations, all the pocket calculators of the Texas Instruments TI-30 series and mono- or bilingual dictionaries (no subject-specific dictionaries) without hand-written notes are admissible. Any other pocket calculator models and any electronic dictionaries 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 notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids
As examination aids we will consider papers and books discussed and analyzed during the lecture.

Examination languages
Question language: English
Answer language: English

Examination content
Contents of the lecture.

Examination relevant literature
Lecture slides.

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.