University of St.Gallen

Course and Examination Fact Sheet: Spring Semester 2023

10,366: Smart Data-driven Econometrics

ECTS credits: 4

Overview examination/s

(binding regulations see below)
Decentral - Written examination (with defined exam duration) (100%)
Examination time: term time

Attached courses

Timetable -- Language -- Lecturer
10,366,1.00 (GSERM) Smart Data-driven Econometrics -- Englisch -- Sperlich Stefan

Course information

Course prerequisites

Participants should bring their laptops and have installed R.

Prerequisites (knowledge of topic):

Required knowledge of statistics and introductory econometrics (or equivalent biometrics, technometrics, etc.) which should comprise basic statistics, estimation and testing in multivariate linear regression models, simple calculus (also with vectors and matrices). Knowledge of estimation should include moment, likelihood, and least squares methods.

Some knowledge of inference in non- or generalized linear models is an advantage.

Learning objectives

The topic is estimation and testing of regression problems typically considered in microeconometrics by the means of (standard) nonparametric methods.

The concept/content is: nonparametric density estimation (univariate, joint, conditional); nonparametric estimation of conditional moments; miscellaneous (model selection, bandwidth choice, conditional distribution); semiparametric estimation of generalized structured models; nonparametric testing.

The approach is teaching half intuition, half (asymptotic) theory.

After a successful completion, the students will know, understand and be able to apply nonparametric methods for data analysis, in particular estimation and regression. Moreover, the mixed approach enables them to broaden and deepen their knowledge in this direction for also applying non- and semiparametric methods in much more complex situations than those outlined in this course.

Course content

Nonparametric density estimation (histograms and kernel densities) for uni- and multivariate distributions; Nonparametric regression (with kernels, kNN, series estimators and splines); Miscellaneous of nonparametric regression (model selection, bandwidth selection, practical issues including implementation); Semiparametric estimation of regression functions and probabilities (in particular backfitting and marginal integration for generalized structured models); Nonparametric specification testing (of parametric, semiparametric and structural hypotheses).

Course structure and indications of the learning and teaching design

Day 1:

Morning session: 1. The basic model for studying variables

From histograms and empirical distribution function to kernel densities;

What means model selection if there is none

Afternoon session: 2. Toward the study of relations of variables

Multivariate/joint densities; Conditional densities

Day 2:

Morning session: 3. Conditional Moments: regression without model specification.

From conditional distributions to conditional moments; Local vs global fits

Afternoon session: continued …

Mixtures of global and local fits

Day 3:

Morning session: 4. Miscellaneous of nonparametric regression

Model selection and its applications;

Afternoon session: continued …

Conditional c.d.f. ; Comments on causality

Day 4:

Morning session: 5. Generalized Structured Models

Basic principles of semiparametrics; Marginal integration; Linear Mixed Models

Afternoon session: continued …

Backfitting; likelihood related approaches

Day 5:

Morning session: 6. Validation of economic models

Bootstrap in non- and semiparametrics; Nonparametric tests

Afternoon session: continued …

Semiparametric tests; Notes on subsampling

Course literature

Recommendations:

W. Härdle, M. Müller, S. Sperlich, A. Werwatz (2004) Nonparametric and Semiparametric Models, Springer Series in Statistics, Springer-Verlag, Heidelberg, NY; ISBN: 3-540-20722-8

For R-codes and more visit http://www.marlenemueller.de/nspm.html

Qi Li and Jeffrey Scott Racine (2006) Nonparametric Econometrics: Theory and Practice, Princeton University Press, Princeton; ISBN: 978069112611

D.J. Henderson and C.F. Parmeter (2015) Applied Nonparametric Econometrics, Cambridge University Press, NY, ISBN: 978-0-521-27968-0

University of St.Gallen

Additional course information

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).

Examination information

Examination sub part/s

1. Examination sub part (1/1)

Examination time and form
Decentral - Written examination (with defined exam duration) (100%)
Examination time: term time

Remark
does not apply

Examination-aid rule
Closed Book

The use of aids is prohibited as a matter of principle, with the exception of pocket calculator models of the Texas Instruments TI-30 series and, in case of non-language exams, bilingual dictionaries without any handwritten notes. Any other aids that are admissible must be explicitly listed by faculty members in the paragraph entitled “Supplementary aids” of the course and examination fact sheet; this list is exhaustive.

Procuring any aids, as well as ensuring their working order, is the exclusive responsibility of students.

Supplementary aids

One DinA4 paper sheet (i.e. 2 pages) with your own notes are permitted.

Nature of examination
analog

Examination languages
Question language: English
Answer language: English

Examination content

The test will written, 120 Minutes at the end of the course.

It will be 50% a multiple choice test with 4 possible answers (one correct).

And another 50% a list of short questions to be answered in text and mathematical formulas. Explicit proofs and calculations are not demanded.

The list of questions in both parts intent to cover all subjects treated, see "Structure" in which the detailed list is given. Students will mainly asked comprehension questions to test both, their understanding and their knowledge of the functioning of nonparametric estimation methods.

Examination relevant literature

-

Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.

Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW21) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 12 are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 04 (Thursday, 26 January 2023);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 12 (Monday, 20 March 2023);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 12 (Monday, 20 March 2023);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the de-registration period in CW 15 (Monday, 10 April 2023).