Course and Examination Fact Sheet: Autumn Semester 2021

7,320: Quantitative Risk Management

ECTS credits: 4

Overview examination/s
(binding regulations see below)
Decentral - Oral examination (individual) (75%)
Examination time: term time
Decentral - examination paper written at home (in groups - all given the same grades) (25%)
Examination time: term time

Attached courses
Timetable -- Language -- Lecturer
7,320.1.00 Quantitative Risk Management -- Englisch -- De Giorgi Enrico Giovanni

Course information

Course prerequisites
Knowledge of a statistical software like MatLab or R is required for the group assignment.

Learning objectives

- Students understand and explain the mathematical models for credit risk and operational risk treated in class. They understand under which assumptions the different models hold, and explain how deviations from the stated assumptions change the implications of the models.
- Students apply the mathematical models for credit risk and operational risk treated in class to any dataset, derive the relevant implications, and explain the economic meaning of the results.

Course content

The global financial crises that erupted in 2008 and the recent COVID-19 pandemic have intensified the interest in risk management among financial institutions. It is now generally recognized that poor risk management has been one of the causes of the current financial crises. In particular, credit risk and operational risk, the first being the risk that a counterparty in a financial contract might fail to fulfil its contractual obligations, the second being the risk of losses due to management failures or inadequate systems, are not well understood.

This course focuses on quantitative models for assessing credit and operational risk. We first introduce the notations of risk factors and risk measures. We then discuss the two main approaches for modeling credit risk. Finally, we study extreme value theory, that deals with extreme events (as big losses due to management failures), and apply it to assess operational risk.

Introduction

- Need for Risk Management
- Risk Factors
- Risk Measures
- From Value-at-Risk to Convex Risk Measures

Credit Risk

- Structural Credit Models: Merton Model and Extensions
Operational Risk

- Introduction
- Extreme Value Theory (ETV)
- Application of EVT to Operational Risk Valuation

Course structure and indications of the learning and teaching design

The course consists of weekly two-hour sessions presenting and discussing well-established theoretical/quantitative frameworks for risk measurement and management, focusing on credit risk and operational risk.

During the sixth session on 25 October 2021 a group assignment (to be solved in groups of maximum 3 students) will be distributed. Students are requested to solve the assignment until 6 December 2021. The assignment is an empirical application of some of the models for credit risk discussed in class, so that students are directly confronted with implementing those models to real data. The assignment allows students to familiarize with the theory and, because the assignment must be solved parallel to the frontal lectures, to stimulate the discussion in class.

During the last week of the semester, an individual oral exam will take place.

Course literature


Additional course information

In the case of the President’s Board having to implement new directives due to the SARS-CoV-2 pandemic in AS2021, the course information listed above will be changed as follows:

- The course is conducted online via Zoom;
- The recordings of the course are permanently available;
- The lecturer informs via StudyNet on the changed implementation modalities of the course;

The examination information listed below would be changed as follows:

- The oral examination are conducted online via Zoom;

Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form
Decentral - Oral examination (individual) (75%)
Examination time: term time

Remark
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Examination-aid rule

Extended Closed Book
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, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids
No additional aids.

Examination languages
Question language: English
Answer language: English

2. Examination sub part (2/2)

Examination time and form
Decentral - examination paper written at home (in groups - all given the same grades) (25%)
Examination time: term time

Remark
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Examination-aid rule
Term papers

Written work must be written without outside help according to the known citation standards, and a declaration of authorship must be attached, which is available as a template on the StudentWeb.

Documentation (quotations, bibliography, etc.) must be carried out universally and consistently according to the requirements of the chosen/specifed citation standard such as e.g. APA or MLA.

The legal standard is recommended for legal work (cf. by way of example: FORSTMOSER, P., OGOREK R., SCHINDLER B., Juristisches Arbeiten: Eine Anleitung für Studierende (the latest edition in each case), or according to the recommendations of the Law School).

The reference sources of information (paraphrases, quotations, etc.) that has been taken over literally or in the sense of the original text must be integrated into the text in accordance with the requirements of the citation standard used. Informative and bibliographical notes must be included as footnotes (recommendations and standards e.g. in METZGER, C., Lern- und Arbeitsstrategien (latest edition)).

For all written work at the University of St.Gallen, the indication of page numbers is mandatory, regardless of the standard chosen. Where page numbers are missing in sources, the precise designation must be made differently: chapter or section title, section number, article, etc.

Supplementary aids
No additional aids.

Examination languages
Question language: English
Answer language: English

Examination content
The following topics are covered by the oral examination.
Introduction
Need for Risk Management
Risk Factors
Risk Measures
From Value-at-Risk to Convex Risk Measures
Credit Risk
Structural Credit Models: Merton Model and Extensions
Reduced Form Credit Model
An Application: Retail Credit Risk Modeling
Operational Risk
Introduction
Extreme Value Theory (ETV)
Application of EVT to Operational Risk Valuation

Examination relevant literature

The lecture notes
"De Giorgi, Enrico (2021): Quantitative Risk Management, Lecture Notes, University of St.Gallen”

represent the necessary examination literature. The lecture notes will be made available on the StudyNet week-by-week, following the discussion in class. Therefore, the relevant material is the one available on the StudyNet at the end of the eleventh session on 13 December 2021.

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 (CW51) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 42 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 34 (Thursday, 26 August 2021);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 18 October 2021);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 18 October 2021);

Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 45 (Monday, 8 November 2021).