Course and Examination Fact Sheet: Autumn Semester 2020

7,320: Quantitative Risk Management

ECTS credits: 4

Overview examination/s
(binding regulations see below)
Decentral - Oral examination (individual) (75%, 15 mins.)
Examination time: term time
Decentral - Group examination paper (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
• Reduced Form Credit Model
• An Application: Retail Credit Risk Modeling

Operational Risk

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

Course structure

• There will be a group assignment (max 3 students/group).
• The oral exam will take place during the last week of the term.

Course literature

1. (*) De Giorgi, Enrico (2020): Quantitative Risk Management, Lecture Notes, HSG.

Additional course information

In the case of the President's Board having to implement new directives due to the SARS-CoV-2 pandemic in AS2020, the course information listed above will be changed as follows:

• The course is conducted online via the platform Zoom;
• The recordings of the course are permanently available;
• The lecturer informs via StudyNet and e-mail on the changed implementation modalities of the course.

The examination information listed below would be changed as follows:

• The oral examinations are conducted online and are being recorded.

Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form
Decentral - Oral examination (individual) (75%, 15 mins.)
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

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### 2. Examination sub part (2/2)

**Examination time and form**
Decentral - Group examination paper (all given the same grades) (25%)
Examination time: term time

**Remark**
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**Examination-aid rule**
Term papers

Term papers must be written without anyone else’s help and in accordance with the known quotation standards, and they must contain a declaration of authorship which is a published template in StudentWeb.

The documentation of sources (quotations, bibliography) has to be done throughout and consistently in accordance with the chosen citation standard such as APA or MLA.

For papers in law, the legal standard is recommended (by way of example, cf. FORSTMOSER, P., OGOREK R. et SCHINDLER B., Juristisches Arbeiten: Eine Anleitung für Studierende, newest edition respectively, or according to the recommendations of the Law School).

The indications of the sources of information taken over verbatim or in paraphrase (quotations) must be integrated into texts in accordance with the precepts of the applicable quotation standard, while informative and bibliographical notes must be added as footnotes (recommendations and standards can be found, for example, in METZGER, C., Lern- und Arbeitsstrategien, newest edition respectively.

For any work written at the HSG, the indication of the page numbers is mandatory independent of the chosen citation standard. Where there are no page numbers in sources, precise references must be provided in a different way: titles of chapters or sections, section numbers, acts, scenes, verses, etc.

**Supplementary aids**
No additional aids.

**Examination languages**
Question language: English
Answer language: English

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### Examination content

- **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
De Giorgi, Enrico (2020): Quantitative Risk Management, Lecture Notes, HSG.

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, 20 August 2020);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 44 (Thursday, 29 October 2020).