



## 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.
2. Embrechts, Paul, Rüdiger Frey, and Alexander McNeil (2005): Quantitative Risk Management: Concepts, Techniques and Tools, Princeton University Press.

## Additional course information

The lectures and the oral exam will be conducted online via the platform zoom. The information to access the lectures will be provided via Studynet.

## 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).