



## Course and Examination Fact Sheet: Autumn Semester 2019

### 9,172: Real Estate Modelling

ECTS credits: 4

#### Overview examination/s

(binding regulations see below)

Decentral - Written examination (60%, 60 mins.)

Decentral - examination paper written at home (individual) (40%)

#### Attached courses

Timetable -- Language -- Lecturer

[9,172,1.00 Real Estate Modelling](#) -- Englisch -- [Adams Zeno](#) , [Füss Roland](#)

#### Course information

#### Course prerequisites

This course focuses on empirical methods in real estate finance and is independent of the course "8,172 Real Estate Finance". The course is for students who would like to train their skills in applied econometrics, empirical applications using software, and current topics in real estate finance. However, no prior knowledge of econometrics, real estate finance, or empirical research with software is required.

This course is recommended for MBF-students in their first or third semester of the program.

#### Course content

This course introduces students to the main quantitative modelling techniques in real estate finance and economics. The course familiarizes students with quantitative methods in panel, spatial, and time series analysis and applications of these models in the area of real estate economics and finance. Computer tutorials will be held using R to provide practical experience. Real-world data are taken from Thomson Reuters Datastream or other vendors of real estate data.

In particular, students will

- become familiar with the properties of real estate data, the fundamental drivers and main indicators of real estate prices, all of which are essential for empirical market analysis;
- learn how to apply econometric models to research questions in real estate finance and economics and to properly interpret the empirical results;
- understand the use of different quantitative methods to derive causal effects as well as its limitations, and will gain awareness of problems dealing with endogeneity, adjusted standard errors, and spurious regression;
- get to know how to derive price and volatility forecasts, and how to utilize quantitative methods for practical use in the real estate sector.

The course covers state-of-the-art techniques to analyze real estate markets. It is suitable for students who wish either to continue their academic career in the field of real estate finance or aim for a position in the real estate industry as a consultant, analyst, or product developer.

#### Course structure

The course covers the following topics:



- *Real estate data, descriptive statistics, and multivariate methods*: What are the typical properties of direct and indirect real estate price series? How can we test for weak-form market efficiency of real estate markets? What are the main indicators needed to analyze real estate markets?
- *OLS and Panel regression*: Which tools are available for constructing real estate indices? What is the difference between appraisal- and transaction-based indices? How do we estimate a hedonic price function or a rent index? What is the advantage of a repeat sales regression? When do we use a random-effects model instead of a fixed-effects model?
- *Spatial regression*: How can we test and measure spatial autocorrelation? How can we modify regression models using geographical distance to account for spatial heterogeneity? How can we analyze spillover effects across metropolitan housing markets?
- *Univariate time series analysis*: How can we model return and volatility series dynamically and make out-of-sample forecasts?
- *Multivariate time series analysis*: How can we conduct an empirical investigation of the market equilibrium hypothesis? How can we make use of the error correction process to enhance the predictability of real estate returns? How can we utilize cointegration analysis to test whether real estate investments trusts (REITs) belong to the real estate or the stock market?

The course offers lectures and R tutorials. Students will be graded based on the final exam and four R assignments that will be handed out during the term. A guest lecturer is invited to deliver insights into his/her practical experience.

## Course literature

- Brooks, C., and S. Tsolacos (2010): *Real Estate Modelling and Forecasting*, Cambridge et al.: Cambridge University Press.
- Brooks, C. (2008): *Introductory Econometrics for Finance*, 2nd ed., New York: Cambridge University Press.
- Geltner, D., N.G. Miller, J. Clayton, and P. Eichholtz (2007): *Commercial Real Estate Analysis and Investments*, 2nd ed., Mason, OH: South-Western Publishing/Thomson Learning.
- LeSage, J., and R.K. Pace (2009): *Introduction to Spatial Econometrics*, Boca Raton, Florida: Chapman & Hall/CRC.

## Additional course information

If you have any questions about this course please contact [zeno.adams@unisg.ch](mailto:zeno.adams@unisg.ch)

## Examination information

### Examination sub part/s

#### 1. Examination sub part (1/2)

##### Examination time and form

Decentral - Written examination (60%, 60 mins.)

##### Remark

Pocket calculator of TI-30 series required

##### 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, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

##### Supplementary aids

No other examination aids are admissible.



## Examination languages

Question language: English

Answer language: English

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

### Examination time and form

Decentral - examination paper written at home (individual) (40%)

### Remark

In total 4 R assignments

### 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.
- The documentation of sources (quotations, bibliography) has to be done throughout and consistently in accordance with the APA or MLA standards. The indications of the sources of information taken over verbatim or in paraphrase (quotations) must be integrated into the text 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. (2017), Lern- und Arbeitsstrategien (12th ed., Cornelsen Schweiz).
- For any work written at the HSG, the indication of the page numbers both according to the MLA and the APA standard is never optional.
- 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.
- For papers in law, the legal standard is recommended (by way of example, cf. FORSTMOSER, P., OGOREK R. et SCHINDLER B. (2018, Juristisches Arbeiten: Eine Anleitung für Studierende (6. Auflage), Zürich: Schulthess, or the recommendations of the Law School).

### Supplementary aids

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## Examination languages

Question language: English

Answer language: English

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## Examination content

Relevant for the exam are the content of the lecture (including slides) and tutorials (including R assignments).

## Examination relevant literature

Selected papers and book chapters that cover the topics in the lecture and the tutorial will assigned during the lectures



## Please note

Please note that this fact sheet alone is binding and has priority over any other information such as StudyNet (Canvas), personal databases or faculty members' websites and information provided in their lectures, etc.

Any possible references and links within the fact sheet to information provided by third parties are merely supplementary and informative in nature and are outside the University of St.Gallen's scope of responsibility and guarantee.

Documents and materials that have been submitted no later than the end of term time (CW51) are relevant to central examinations.

Binding nature of the fact sheet:

- Information about courses and examination time (central/decentral) and examination type starting from the beginning of the bidding on 22 August 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for decentral examinations after the 4th semester week on 14 October 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for central examinations as from the starting date for examination registration on 4 November 2019

Please consult the fact sheet again after these deadlines have expired.