University of St.Gallen

Course and Examination Fact Sheet: Autumn Semester 2020

9,172: Real Estate Modelling

ECTS credits: 4

Overview examination/s

(binding regulations see below)
Decentral - Written examination (60%, 60 mins.)
Examination time: term time
Decentral - examination paper written at home (individual) (40%)
Examination time: term time

Attached courses

Timetable -- Language -- Lecturer
9,172,1.00 Real Estate Modelling -- Englisch -- 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.

Learning objectives

Upon completion, students will:

1) 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.

2) Know how to apply econometric models to research questions in real estate finance and economics and to properly interpret the empirical results.

3) 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.

4) Know how to derive price and volatility forecasts, and how to utilize quantitative methods for practical use in the real estate sector.

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.

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.

The course covers the following topics:

1) *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?

2) *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?

3) *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?

4) *Univariate time series analysis:* How can we model return and volatility series dynamically and make out-of-sample forecasts?

5) *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 investment trusts (REITs) belong to the real estate or the stock market?

Course structure

In light of the current SARS-CoV-2 situation, we strive to strike a balance between the important protection measures and the benefits coming from the atmosphere of traditional on-campus learning. Therefore, the lectures will be conducted with a combination of elements from on-campus and online learning.

Specifically:

1) On- campus lectures are conducted in a rotating format to ensure compliance of the distancing in lecture rooms. Students are assigned randomly to 2 groups: group 1 and group 2. Group 1 will be present at the lecture room for the first lecture, and every other lecture thereafter. Group 2 will be present at the lecture room for the second lecture, and every other lecture thereafter.

2) Each lecture will be streamed live and recorded, both to enable the learning by the group that is not present in the lecture room and to provide all of you opportunities to revisit the lectures.

We understand that the situation might change, thus the plan laid out above might require alterations. We therefore refer students to also look at our contingency plan in the Supplementary Information section.

The course offers lectures and R tutorials. Students will be graded based on the final exam and 4 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 Analyisis 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

I. Contingency Plan:

Upon changing situations related to SARS-CoV-2 and potential cases of force majeure:

1) All lectures will be moved online. That is, no on-campus lectures will be conducted.

2) All planned examination components that require physical presence will be moved online.

Examination information

University of St.Gallen

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form
Decentral - Written examination (60%, 60 mins.)
Examination time: term time

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, 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%)
Examination time: term time

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 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
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Examination languages
Question language: English
Answer language: English

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

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Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are is 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).