



Course and Examination Fact Sheet: Spring Semester 2019

8,316: Econometric Methods for Financial Instruments

ECTS credits: 4

Overview examination/s

(binding regulations see below)

Decentral - Oral examination (individual) (70%, 15 mins.)

Decentral - Group examination paper (all given the same grades) (30%)

Attached courses

Timetable -- Language -- Lecturer

[8,316,1.00 Econometric Methods for Financial Instruments](#) -- Englisch -- [Fengler Matthias](#)

Course information

Course prerequisites

Basic knowledge in derivatives & asset pricing is helpful; a sound stat, math, econometrics basis is mandatory.

Course content

The class discusses econometric modeling and statistical inference for financial instruments data.

The course is relevant for students planning to work professionally with financial data. In part one, the class covers diffusion processes and discusses methods for approximation and estimation; the second part is devoted to miscellaneous topics such as modeling the Black-Scholes-Merton implied volatility, the estimation of option price functions and state price densities. Students learn how to analyze and to appropriately model financial instruments data.

Course structure

1. Basic concepts of probability theory
2. Basic concepts of stochastic processes
3. Diffusions
4. Maximum likelihood estimation
5. Estimation of diffusions by means of ML
6. Method of Moments
7. Estimation of diffusions by means of GMM and simulated MM
8. Models of implied volatility
9. Estimation of option pricing functions and state price densities
10. Implied trees

Course literature

Gouriéroux, Jasiak (2001): Financial Econometrics, Princeton University Press, Iacus, St. (2010) **Simulation and Inference for Stochastic Differential Equations**, Springer-Verlag Derman, Kani (1994), The Volatility Smile and Its Implied Tree, Goldman Sachs Research Paper, downloadable from <http://www.ederman.com/new/index.html> Rubinstein (1994), Implied binomial trees, Journal of Finance, 49, 771- 818 Figlewski (2008), Estimating the Implied Risk Neutral Density for the U.S. Market Portfolio, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1256783&rec=1&srcabs=961512

Additional course information

--



Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form

Decentral - Oral examination (individual) (70%, 15 mins.)

Remark

--

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

--

Examination languages

Question language: English

Answer language: English

2. Examination sub part (2/2)

Examination time and form

Decentral - Group examination paper (all given the same grades) (30%)

Remark

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

--

Examination languages

Question language: English

Answer language: English

Examination content

Please note: If an exam question requires information on slides, the lecturer will provide a copy of the respective slides. Students will not be able to use their own copy.

1. Basic concepts of probability theory
2. FHH 3
3. Basic concepts of stochastic processes
4. FHH 4
5. Diffusions
6. FHH 5; GJ 11
7. Maximum likelihood estimation
8. General exposition: G 17
9. Estimation of diffusions by means of ML
10. GJ 12.1; CLM 9.3-9.3.2; Hurn, Jeisman, Lindsay; Cysne.
11. Method of Moments
12. General exposition: G 18
13. Exposition of GMM with a more direct reference to applications in finance: GJ 8.3; Cochrane (2005) 11.1-11.2
14. Estimation of diffusions by means of GMM and simulated MM
15. GJ 12.2; GJ 12.4; Hurn, Jeisman, Lindsay; Cysne
16. Models of implied volatility
17. NLS: G 9; F 2.5
18. Estimation of option pricing functions and state price densities
19. Figlewski (2008); GJ 13.1.4
20. Implied trees
21. I follow: Härdle, Mysickova; Seydel (2011)
22. Original work is: Derman, Kani (1994)

Examination relevant literature

All documents published via study net by 24 May 2019.

The starred titles printed in bold are strictly recommended references.

Books:

- CLM: Campbell, Lo, MacKinlay (2005). The econometrics of financial markets, Princeton University Press.
- Cochrane (2005), Asset Pricing, Princeton University Press, Revised Edition.
- Fengler(2005) , Semiparametric modeling of implied volatility, Springer-Verlag.

FHH: Franke, Härdle, Hafner (2004), Statistics of Financial Markets, Springer-Verlag*. **Iacus, S. (2010): Simulation and Inference for Stochastic Differential Equations, Springer-Verlag***

- G: Greene (2003), 5th edition, Econometric Analysis.
- **GJ: Gouriéroux, Jasiak (2001): Financial Econometrics, Princeton University Press*.**

Papers:

- Cysne, On the Statistical Estimation of Diffusion Processes - A Partial Survey (Revised Version, Forthcoming Brazilian Review of Econometrics)



- Derman, Kani (1994), The Volatility Smile and Its Implied Tree, Goldman Sachs Research Paper, downloadable from <http://www.ederman.com/new/index.html>
- Figlewski (2008), Estimating the Implied Risk Neutral Density for the U.S. Market Portfolio, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1256783&rec=1&srcabs=961512
- **Härde, Mysickova: Numerics of Implied Binomial Trees; Applied Quantitative Finance, Springer-Verlag.***
- Hurn, Jeisman, Lindsay, Seeing the Wood for the Trees: A Critical Evaluation of Methods to Estimate the Parameters of Stochastic Differential Equations
- Rubinstein (1994), Implied binomial trees, Journal of Finance, 49, 771- 818
- Seydel: Lattice Approach and Implied Trees; Handbook of Computational Finance; forthcoming.

Please note

We would like to point out to you that this fact sheet has absolute priority over other information such as StudyNet, faculty members' personal databases, information provided in lectures, etc. When will the fact sheets become binding?

- Information about courses and examination time (central/decentral and grading form): from the start of the bidding process on 24 January 2019
- Information about decentral examinations (examination-aid rule, examination content, examination relevant literature): after the 4th semester week on 18 March 2019
- Information about central examinations (examination-aid rule, examination content, examination relevant literature): from the start of the enrolment period for the examinations on 08 April 2019

Please look at the fact sheet once more after these deadlines have expired.