



北京理工大学国际特色课程

Beijing Institute of Technology Global Courses

FIN9303 - FINANCIAL ECONOMETRIC METHODS AND APPLICATIONS

Syllabus

July. 1 - July. 19, 2024

Term Duration: July. 1 - July. 19, 2024

Credit Points: 4

Level: Postgraduate

Instructor Name: TBA

Home Institution: Beijing Institute of Technology

Lecture Hour: 9:00-12:00

Course Description

This course delves into the complex world of financial econometrics, furnishing students with the essential quantitative tools and analytical frameworks required for sophisticated financial market analysis. Beginning with a solid grounding in mathematics, probability, and statistics, the curriculum swiftly progresses to key concepts of market efficiency. Students will systematically dissect and comprehend a variety of financial models and theories, such as the Capital Asset Pricing Model, multifactor pricing models, and intricate derivative pricing models. A significant emphasis is placed on time series analysis, sharpening the focus on both linear and multivariate techniques, and their practical financial applications. The course further escalates into the exploration of advanced topics including conditional heteroskedastic models, ARCH and GARCH models, culminating with the study of nonlinear patterns within financial datasets. This rigorous academic journey is crafted to bestow upon students a profound understanding of volatility and risk, arming them with the acumen to navigate and analyze the unpredictable nature of financial markets.

Course Aims:

Upon successful completion of this course, students should be able to:

1. apply mathematical, probability, and statistical techniques to analyze and interpret financial data;
2. assess the efficiency of financial markets using rigorous econometric methods;
3. evaluate the predictability of asset returns and understand the implications of market microstructure;
4. demonstrate proficiency with the Capital Asset Pricing Model and multifactor pricing theories to assess investment risks and returns;
5. develop volatility models, including ARCH and GARCH models, to forecast and manage financial risks;
6. apply extreme value theory and quantile estimation techniques to the measurement and management of financial risks;
7. identify and analyze nonlinear patterns in financial data, enhancing predictive financial modeling strategies.

Language of Instruction

English

Required Textbook

The Econometrics of Financial Markets, 2nd Edition

Author: John Y. Campbell, Andrew W. Lo, A. Craig MacKinlay

Publisher: Princeton University Press

ISBN: 9780691043012

Analysis of Financial Time Series, 3rd Edition

Author: Ruey S. Tsay

Publisher: Wiley

ISBN: 9780470414354

Statistical Analysis of Financial Data in R

Author: René Carmona

Publisher: Springer

ISBN: 9781461487876

Other materials provided by the course lecturer.

Course Hours

This course requires 48 hours of contact including 42 hours of lectures and one 6-hour field trip. Lectures are from Monday to Friday.

Prerequisite Course

Students are expected to have taken **Econometrics** or to possess a thorough knowledge of the topics covered in the mentioned course.

Course Schedule

Week	Day	Lecture	Topic	Assignment/ Notes
Week 1	Day 1	Lecture 1	Mathematics, Probability and Statistics Background; Market Efficiency	John Y. Campbell (Chap 1)
	Day 2	Lecture 2	The Predictability of Asset Returns; Market Microstructure	John Y. Campbell (Chap 2-3)
	Day 3	Lecture 3	The Capital Asset Pricing Model	John Y. Campbell (Chap 5)
	Day 4	Lecture 4	Multifactor Pricing Models; Present-Value Relations	John Y. Campbell (Chap 6-7)
	Day 5	Lecture 5	Intertemporal Equilibrium Models Derivative Pricing Models	John Y. Campbell (Chap 8-9)
Week 2	Day 6	Lecture 6	Linear Time Series Analysis and Its Applications	Ruey S. Tsay (Chap 2)
	Day 7	Lecture 7	Conditional Heteroscedastic Models	Ruey S. Tsay (Chap 3)
	Day 8	Lecture 8	ARCH Models; GARCH Models; Stochastic Volatility Models	René Carmona (Chap 8)
	Day 9	Lecture 9	Extreme Values, Quantile Estimation, and Value at Risk	Ruey S. Tsay (Chap 7)
	Day 10	Industrial Visit		
Week 3	Day 11	Lecture 10	Multivariate Time Series Analysis and Its Applications; Vector ARMA Models	Ruey S. Tsay (Chap 8)

Day 12	Lecture 11	Multivariate Volatility Models and Their Applications	Ruey S. Tsay (Chap 9)
Day 13	Lecture 12	Nonlinearities in Financial Data	John Y. Campbell (Chap 12)
Day 14	Guided Revision		
Day 15	Final Exam		

Note: Students will be notified if the schedule of the field trip changes according to the situation.

Grading Policy

Method	Percentage
Participation	10%
Quizzes	5%
Assignments	15%
Mid-Semester Test	20%
Final Exam	50%
Total	100%

Participation: Students are expected to attend all course sessions punctually. Absences will impact the attendance grade. We will have some case studies, quizzes and group discussion in class and the performance will be considered as partial attendance points or bonus.

Quizzes: Short-answer quizzes, lasting 20 minutes, will be administered during class to assess understanding of recent topics.

Assignments: Each student is required to individually complete two assignments. Assignments will be a combination of theoretical questions and problem-solving exercises related to the topics covered in lectures.

Mid-Semester Test: The test will span a duration of 2 hours and will assess students on the material covered in the first half of the course. Students are expected to demonstrate their knowledge and analytical skills through this examination.

Final Exam: The final exam will be a comprehensive assessment encompassing all course content. This exam will have a duration of 3 hours, and students will be evaluated on their understanding and application of the material covered throughout the course.

Academic Honesty

Academic honesty is not only a fundamental part of learning and teaching, but also a core value that this course embraces. Behaviors of academic dishonesty, as outlined hereinafter, are unacceptable and will be penalized:

- a) Plagiarism where students present work for assessment, publication or otherwise that is not their own, without appropriate attribution or reference to the original source. Plagiarism can include:
 - i) paraphrasing or copying published and unpublished work without a reference;
 - ii) adopting the ideas or concepts of others, including the structure of an existing analysis without due acknowledgement by way of reference to the original work or source.
- b) Collusion, where students present work as independent work when it has in fact been produced in whole or in part with others unless prior permission for joint or collaborative work has been given by the Course Coordinator. Collusion can include:
 - i) a student inappropriately assisting with or accepting assistance with the production of an assessment task;
 - ii) submitting work which is the same or substantially similar as another student's work for the same assessment task.
- c) Cheating, where a student acts in such a way as to seek to gain unfair advantage or assist another student to do so. Cheating can include:
 - i) submitting falsified, copied or improperly obtained data relating to results of practicum, field trips or other work as if they were genuine; submitting an assessment task with the intention of deceiving or misleading the instructor about the student's contribution to the work;
 - ii) submitting an assessment task written or answered for the student by another person or which the student has copied from another person;
 - iii) submitting the same or a substantially similar piece of work for assessment in two different courses (except in accordance with approved study and assessment schemes);
 - iv) a student falsely indicating that they have been present at an activity where attendance is required;
 - v) completing an assessment task outside the conditions specified for that task.
- d) Cheating in Examinations means engaging in dishonest practice or breaching the rules regarding examinations, which can include:
 - i) communicating in any way during an examination with any person who is not an examination supervisor inside or outside the examination venue;
 - ii) giving or accepting assistance from any person who is not an examination supervisor whilst in the examination venue;
 - iii) reading, copying from or otherwise using another student's work in an examination or knowingly allowing a student to do so;
 - iv) possessing, referring to or having access to any material or device containing information directly or indirectly related to the subject matter under examination, other than that explicitly approved by the Course Coordinator;
 - v) acquiring, or attempting to acquire, possess or distribute examination materials or information without approval;
 - vi) permitting another person to attend an examination on a student's behalf or attending an examination on behalf of another student;
- e) Other dishonest acts including but not limited to:

- i) altering or falsifying any document or record for the purposes of gaining academic advantage;
- ii) offering or giving money or any item or service to a University staff member or any other person to gain academic advantage for the student or another person;
- iii) inventing references.