

Department of Economics
ECON 5055 – Financial Econometrics
Winter 2022

Instructor: Minjoon Lee
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(Please include “Econ 5055” in the subject line.)
Office Hours: Tu 1:05 – 2:25 (tentative), Online

Lectures: W 2:35 – 5:25, In-person as Hyflex, Location TBD



Course Description: This course applies time-series econometric techniques to financial time-series data. The first half of this course covers general time-series models, including ARMA and GARCH, focusing on applying them to financial data. The second half covers topics that are more specific to the financial market, such as models for high-frequency data, market structure, and risk measurement. There will be a heavy emphasis on implementing estimations using actual financial data.

Prerequisite(s): Econ 5027 or equivalent, or by permission of the department.

Required Textbook: Ruey S. Tsay, Analysis of Financial Time Series, Wiley, 3rd edition. ISBN-13: 978-0-470-41435-4.

Reading List: Additional readings or material may be assigned during the term.

Lectures:

In-person lectures with the Hyflex option for those who cannot attend in person. Those who plan to participate online should have a good internet connection, a webcam, and a microphone to be able to participate in the class actively.

Note that a webcam is required for all the students (for even those who plan to attend lectures in person) as it is required for e-proctoring (see below for e-proctoring).

Lectures will also be recorded, but real-time participation is recommended.

Online Office Hours:

Interactive online office hours will be held on Zoom.

Brightspace: This course will make heavy use of Brightspace. I will post materials, including slides, problem sets, and answer keys. I will also use Brightspace to make announcements. Please make sure that you are set up on Brightspace prior to the course start date. For assistance with cuLearn contact the ITS Service Desk (4th Floor, MacOdrum Library, telephone: 613-520-3700.

Computer Program: Students are highly encouraged to use Matlab in applying the covered models to financial data, but students can also choose to use Stata instead. Both programs are available under the university-wide license.

Course Outline (Tentative)

Week (Date)	Topic	Textbook Chapter	Assignment due
1 (Jan 12)	Financial time series and their characteristics	Ch 1	
2 (Jan 19)	Linear time series and applications	Ch 2	
3 (Jan 26)	Linear time series and applications	Ch 2	
4 (Feb 2)	Linear time series and applications	Ch 2	PS1 due
5 (Feb 9)	Conditional heteroskedastic models	Ch 3	
6 (Feb 16)	In-class exam 1 , Conditional heteroskedastic models	Ch 3	
7 (Mar 2)	High frequency data analysis	Ch 5	PS 2 due
8 (Mar 9)	High frequency data analysis	Ch 5	
9 (Mar 16)	Extreme values, quantiles, and value at risk	Ch 7	
10 (Mar 23)	Extreme values, quantiles, and value at risk	Ch 7	PS 3 due
11 (Mar 30)	In-class exam 2		
12 (Apr 6)	Final project presentation		

Student Evaluation & Course Grades: *Each student's grade shall be calculated as follows:*

- 3 Problem sets : 30%
- 2 in-class exams : 40%
- Final project presentation : 10%
- Final project paper : 20%

Problem Sets: There will be three problem sets. The problem sets are due at the beginning of the lectures on the specified dates (see the above Outline). PS 1 and 3 count for 8% each; PS 2 counts for 14%.

The grading is based on effort and completeness, not on the accuracy of the answers. Each assignment will be graded on a scale of {0,1,2}. In answering the questions, students are expected to show their work, i.e., write down key logical steps, provide programming codes that are well documented, as well as present final answers in an easy-to-read format. Late submissions will not be accepted. If you fail to submit a problem set and do not provide proper documentation, you will be assigned a mark of zero.

In-class Exams: There will be two written in-class exams: One on February 16 (2:35 pm – 4:05 pm) and the other on March 30 (2:35 pm – 4:05 pm). The link to the midterm exam will be

made available on Brightspace at 2:35 pm sharp. Students will have 90 minutes to complete the exam, scan their work, and submit a PDF or compressed file through Brightspace. Students who can document a compelling reason for missing an exam will be excused, and the weight of the exam will be automatically added to the other one.

e-proctoring: For both in-class exams, this course will use CoMaS, an e-proctoring software. Students should make sure that there is no issue in installing and running this software during the exams. For details, please see: <https://carleton.ca/ses/wp-content/uploads/CoMaS-Student-Instructions-v.-1.11.pdf>

Final Project: For the final project, each student needs to choose a methodology covered in the course and apply it to a financial time series. In both the presentation and paper, students are expected to explain (i) why studying the chosen time series is important, (ii) why the chosen methodology is appropriate for the time series, (iii) related literature, and (iv) main findings and their implications.

Students need to get a permission on the topic and methodology by the end of the reading week. More details on the formats of the presentation and paper will be announced at the beginning of the semester.

Re-grading: Any request for the remarking of exams must be submitted in writing within two weeks of that exam. The request should contain a detailed explanation of why you feel you should receive a higher mark. Please note that remarking will apply to the entire exam not just the contentious question. As a result, the revised mark may be higher than, lower than or the same as the original mark.

NOTE:

For verification and security purposes, I will not reply to emails originating from non-Carleton e-mail accounts, and which are not signed with a student's name and student number. Assignments and changes to schedules will be made available on cuLearn only. Please ensure that you have a Carleton email account.

Information for Pandemic Measures:

All members of the Carleton community are required to follow COVID-19 prevention measures and all mandatory public health requirements (e.g. wearing a mask, physical distancing, hand hygiene, respiratory and cough etiquette) and [mandatory self-screening](#) prior to coming to campus daily.

If you feel ill or exhibit COVID-19 symptoms while on campus or in class, please leave campus immediately, self-isolate, and complete the mandatory [symptom reporting tool](#). For purposes of contact tracing, attendance will be taken in all classes and labs. Participants can check in using posted QR codes through the cuScreen platform where provided. Students who do not have a smartphone will be required to complete a paper process as indicated on the [COVID-19 website](#).

All members of the Carleton community are required to follow guidelines regarding safe movement and seating on campus (e.g. directional arrows, designated entrances and exits,



designated seats that maintain physical distancing). In order to avoid congestion, allow all previous occupants to fully vacate a classroom before entering. No food or drinks are permitted in any classrooms or labs.

For the most recent information about Carleton's COVID-19 response and required measures, please see the [University's COVID-19 webpage](#) and review the [Frequently Asked Questions](#) (FAQs). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca

Please note that failure to comply with University policies and mandatory public health requirements, and endangering the safety of others are considered misconduct under the [Student Rights and Responsibilities Policy](#). Failure to comply with Carleton's COVID-19 procedures may lead to supplementary action involving Campus Safety and/or Student Affairs.

Plagiarism:

Please be aware that plagiarism is serious offense at Carleton and should be recognized and avoided. For further information on how to do so, please see "Academic Integrity and Offenses Conduct" at <https://carleton.ca/economics/courses/writing-preliminaries/academic-integrity-and-offenses-of-conduct/>.

Requests for Academic Accommodation:

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wpcontent/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your

instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your



instructor as soon as possible to ensure accommodation arrangements are made.

carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

<https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline