

UNIVERSITY OF COLORADO - DEPARTMENT OF ECONOMICS
ECON 4858 FINANCIAL ECONOMETRICS
PROFESSOR CARLOS BRUNET MARTINS-FILHO
FALL 2023

Office. Economics Building 105.

Meetings. Tuesdays and Thursdays 11:00 AM - 12:15 PM at Econ 117.

Office hours. Office hours will be held Tuesdays and Thursdays from 3:30 PM - 4:30 PM. If you need an appointment outside these hours send an email to carlos.martins@colorado.edu and I will try to accommodate your request.

Prerequisites. Successful completion of ECON 3818 or equivalent is a required prerequisite. Completion of ECON 4818 is desirable, but not necessary.

Objectives. Introduce statistical models, estimation and testing procedures used in analyzing financial data.

Class URL. <http://spot.colorado.edu/~martinsc/4858.html>.

Grades. Grades (A-F) will be based on the following:

- There will be two midterm examinations. Each is worth 30 percent of your course grade.
- There will be a final examination. It is worth 40 percent of your course grade.

Throughout the term I will assign homework sets. They will not be graded. I encourage all students to answer these questions. They are a very good guide to the type of questions that will appear on the midterm and final examinations. Some of these questions will require the use of MATLAB, the software we will use for data analysis.

Dates for the examinations:

Examination	Date and Time
Midterm 1	September 28
Midterm 2	November 2
Final Examination	December 19, 1:30 PM - 4:00 PM

Textbook.

1. Ruppert, D., 2004, *Statistics and Finance: An Introduction*. Springer, New York.

Additional.

1. Bernstein, P., 2005, *Capital Ideas: The Improbable Origins of Modern Wall Street*. John Wiley and Sons, New York.

This book gives an informal and historical account of the development of many of the models we treat in class. Great reading for all students in this course.

2. Lai, T. L., and Peng, H., 2008, *Statistical Models and Methods for Financial Markets*. Springer, New York.

3. Ruppert, D., 2011, *Statistics and Data Analysis for Financial Engineering*. Springer, New York.

This book contains much of the material in our textbook. In many instances, however, the treatment is more advanced.

4. Frain, J. C., 2014, MATLAB for Economics and Econometrics: A Beginners Guide. Trinity College Economics Papers - Working Paper 0414.

This is a step-by-step introduction to MATLAB with a focus on the Econometrics Toolbox.

Topics.

All topics covered depend on some fundamental statistical concepts and results from Chapter 2 of your textbook and Econ 3818. As such, throughout the course, we will be repeatedly using the concepts and results from Chapter 2.

1. Returns [Chapter 3, sections 3.1-3.5]
 - Gross returns, Net returns and log returns
 - The random walk model
 - The efficient market hypothesis
2. Maximum likelihood, method of moments estimation and hypothesis testing [Chapter 2, sections 2.18, 2.19, 2.20]
3. Time Series Models [Chapter 4]
 - Stationarity
 - Autoregressive AR(p) models and estimation
 - Moving average models MA(q) and estimation ARMA models
 - GARCH models and estimation
 - Model selection: Akaike's information criterion (AIC) and Bayesian information criterion (BIC)
4. Regression [Chapter 6, sections 6.1, 6.2, 6.3, 6.4, 6.7, 6.8]
 - Least squares estimation
 - Regression and best linear prediction
 - Non-normality and data transformations
5. Portfolio Theory [Chapter 5, sections 5.1-5.6]
 - Trading off expected return and risk
6. The Capital Asset Pricing Model [Chapter 7, sections 7.1-7.8]
 - Capital market line, security market line
 - Security characteristic line
 - Using CAPM in portfolio analysis
 - Factor models
7. Value-at-Risk [Chapter 11]

Important information.

- Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student conduct and conflict resolution](#).

- As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus.

As of August 13, 2021, CU Boulder has returned to requiring masks in classrooms and laboratories regardless of vaccination status. This requirement is a temporary precaution during the delta surge to supplement CU Boulder’s COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if you are sick or quarantined, please send me an email explaining your absence due to illness or quarantine.

- If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to me during the first two weeks of class so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or by e-mail dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.
- CU Boulder recognizes that students’ legal information doesn’t always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors’ class rosters. In the absence of such updates, the name that appears on the class roster is the student’s legal name.
- Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, if the midterm, final or homework due dates prevent/inhibit you from exercising your rights to religious observance, please inform me by August 29, so that reasonable accommodations can be made. See full details at [campus policy regarding religious observances](#).
- The University of Colorado at Boulder is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). The University of Colorado at Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this The University of Colorado at Boulder policy, “Protected

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- All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at www.colorado.edu/policies/honor.html and at <http://honorcode.colorado.edu>.