University of Colorado - Department of Economics - Fall 2020
ECON 4858 Financial Econometrics
Professor Carlos Brunet Martins-Filho

Meetings. Class meetings will be held remotely, via Zoom, Tuesdays and Thursdays 12:45 PM - 2:00 PM. You will receive an email with a Zoom meeting invitation for each class meeting. All of our meetings will be recorded. You should have your **video turned on** and your **audio turned o** , except, of course, when you want to ask a question or when you respond to a question I have asked.

O ce hours. O ce hours will be held remotely, via Zoom, Tuesdays and Thursdays from 4:00 PM - 5:30 PM. You will receive an email with a Zoom meeting invitation to join me for o ce hours. O ce hours will not be recorded. 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 nancial data.

Class URL. This course has a Canvas page where you will nd this syllabus, class slides, class notes, homework assignments and recordings of every class meeting. Consult the Canvas page regularly.

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

> There will be ve sets of homework questions that will not be graded. However, you must turn in your answers at the speci ed due date. I will provide answers for these questions. Failing to submit answers for a homework set will result in a 10 percent reduction on your **course** grade.
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> There will be two midterm examinations. Each accounts for 30 percent of your course grade.
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> There will be a nal examination. It accounts for 40 percent of your course grade.

Dates for the examinations:

Examination	Date and Time
Midterm 1	October 1
Midterm 2	November 5
Final Examination	December 12, 4:30 PM - 7:00 PM

Homework sets will be available on the class web site with their respective due dates.

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.

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. Tsay, R. S., 2010, Analysis of Financial Time Series. John Wiley & Sons, Hoboken, New Jersey.

   This is an advanced textbook, normally used in graduate courses. Its study is recommended for those that have taken more advanced courses in probability, statistics and econometrics and are looking for a deeper understanding of what we discuss in class.

5. Hanselman, D. and Little eld, B., 2005, Mastering MATLAB 7. Pearson, Upper Saddle River, New Jersey.

   This is one of many step-by-step manuals/guide to MATLAB that are commercially available. It is very easy to read and provides speedy access to the many resources this software o ers.

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

   This is another 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

   Gross returns, Net returns and log returns

   The e cient market hypothesis

2. The random walk model

3. Maximum likelihood and method of moments estimation

4. Time Series Models

   Stationarity

   Autoregressive AR(p) models and estimation

   Moving average models MA(q) and estimation ARMA models

   GARCH models and estimation

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7. The Capital Asset Pricing Model
   - Capital market line, security market line
   - Security characteristic line
   - Using CAPM in portfolio analysis
   - Factor models
8. Fixed income securities
   - Zero-coupon bonds, coupon bonds
   - Yield to maturity
   - Term structure
   - Continuous compounding
   - Continuous forward rates
   - Sensitivity of price to yield
9. Value-at-Risk

Important information.

Students and faculty each have responsibility for maintaining an appropriate learning environment. 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 di erences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See polices at www.colorado.edu/policies/classbehavior.html. and at www.colorado.edu/studenta airs/judiciala airs/code.html#student_code.

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 public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- { maintain 6-foot distancing when possible,
- { wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- { clean local work area,
- { practice hand hygiene,
- { follow public health orders, and
- { if sick and you live o campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert CU Boulder Medical Services.

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 Con ict Resolution. For more information, see the policies on COVID-19 Health and Safety and classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from ful lling these safety measures, please see the ?Accommodation for Disabilities? statement on this syllabus. Before returning to campus, all students must complete the COVID-19 Student Health and Expectations Course. Before coming on to campus each day, all