University of Colorado - Department of Economics - Fall 2012
ECON 4858 Financial Econometrics
Professor Carlos Martins-Filho

O ce. Economics Building 105.

Meetings. Mondays, Wednesdays and Fridays 1:00 PM - 1:50 PM in ECON 117.

O ce hours. Wednesdays 2:00 PM - 3:30 PM and by appointment. For appointment send an email to carlos.martins@colorado.edu.

Prerequisites. Successful completion of ECON 3818 or equivalent is a required pre-requisite. ECON 4818 is desirable, but by no means necessary.

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

Class URL. http://spot.colorado.edu/∼martinsc/ECON_4858.html.

Grades. Grades (A-F) will be based on the following2nol ng2nol ng2nol ng2nol ng2nol 439333.7618 1ng225030

3. Campbell, J., Lo, A., and MacKinlay, A. C., 1997, The Econometrics of Financial Markets. Princeton University Press, Princeton, 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.

4. 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.

Topics.

All readings are from the textbook and class notes.

1. Introduction and Basic Concepts for Probability and Statistical Models
   - Random variables
   - Distribution functions, Cumulative distribution functions
   - Quantiles Moments Order statistics
   - Skewness, kurtosis and heavy tail distributions
   - Multivariate distributions, marginals and conditional distributions
   - Prediction Estimation - maximum likelihood, least squares
   - Hypothesis testing and con dence intervals
2. Returns (3 hours) The random walk model
   - The e cient market hypothesis
3. Time Series Models
   - Stationarity
   - Autoregressive AR(p) models and estimation
   - Moving average models MA(q) and estimation ARMA/ARIMA models
   - Model selection: Akaikes information criterion (AIC) and Bayesian information criterion (BIC)
   - Forecasting
4. Portfolio theory
   - Trading o expected return and risk
5. Regression
   - Least squares estimation
   - Regression and best linear prediction
   - Non-normality and data transformations

6. The capital asset pricing model
    - Capital market line, security market line
    - Security characteristic line
    - Using CAPM in portfolio analysis
    - Factor models
7. Fixed income securities
    - Zero-coupon bonds, coupon bonds
    - Yield to maturity
    - Term structure
    - Continuous compounding
    - Continuous forward rates
    - Sensitivity of price to yield
8. GARCH Models
9. Value-at-Risk
    - One asset
    - Portfolio
10. Options pricing
    - Call options
    - The law of one price
    - Pricing calls
    - Martingales
    - The Black-Scholes model, formula and its use
    - Puts
    - Evolution of option prices
    - Leverage of options and hedging

Important information.

- If you qualify for accommodations because of a disability, please submit a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail dsinfo@colorado.edu.

  If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

-

- 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.

- 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 www.colorado.edu/academics/honorcode/.

- The University of Colorado Policy on Sexual Harassment applies to all students, sta and faculty. Sexual harassment is unwelcome sexual attention. It can involve intimidation, threats, coercion, or promises or create an environment that is hostile or o ensive. Harassment may occur between members of the same or opposite gender and between any combinations of members in the campus community: students, faculty, sta , and administrators. Harassment can occur anywhere on campus, including the classroom, the workplace, or a residence hall. Any student, sta or faculty member who believes s/he has been sexually harassed should contact the O ce of Discrimination and Harassment (ODH) at 303-492-2127 or the O ce of Judicial A airs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals who believe they have been sexually harassed can be obtained at www.colorado.edu/odh/.