Instructor Information

- **Instructor:** Professor Liang Peng
- **Office:** Room 1133, Robinson College of Business (35 Broad Street)
- **Office Hours:** 14:00–16:00 of Wednesday or by appointment (just send me an email)
- **Phone:** 404-413-7489
- **Email:** lpeng@gsu.edu
- **WebPage:** sites.gsu.edu/lpeng

Class Information

- **Location:** Langdale Hall 231
- **Time:** Wednesday, 4:30 pm - 7:00 pm (First lesson is 08/26/2015 and last lesson is 12/2/2015).
- **Prerequisite:** Econ 8740 or equivalent. In particular you should be familiar with the basics of probability and statistics, and inference in the classical linear regression models.
- **Website:** DESIRE2LEARN – https://gsu.view.usg.edu/

Catalog Description:

This course covers econometric models and methods for financial markets data. It is designed for those who want to learn about the theoretical background and implementation details of important models used in financial econometrics. In particular, the course covers the modeling of univariate and multivariate distributions, copulas, basic time series models and volatility models. We will also see how to program each of these models. We will make extensive use of the open-source R programming language, which is freely available at www.r-project.org.

Course Objectives

- identify empirical features and characteristics of various types of financial data;
- learn about various econometric models that can capture these features;
- develop your own computer programs implementing these models.

References

This course follows the book:
Another reference book is:
Grading

The grades will be based on: (i) homework, (ii) a midterm exam, (iii) a final project. Your grade will be determined as 40% HWs, 30% exam, and 30% final project. The date for the midterm exam is 10/28. The details on final project will be announced in class and on the course web in due course.

Grades will be awarded on a +/- basis, and the following guaranteed scale applies. Grades may be moved upward based on difficulty, but not downward:

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Attendance

Attendance is not formally taken. However, it is strongly suggested that students do not miss class as most students will have difficulties completing the assignments without attending the lectures.

Course outline

The following list of topics maps directly into the Ruppert book although some supplementary materials will be added during lectures. Deviation from the following list may be necessary. Please keep an eye on D2L for materials and announcements.

- Returns: net returns; gross returns; log returns; adjusting for dividends; multi-period returns; random walk models.
- Modeling univariate distributions: skewness; kurtosis; moments; tests of normality; heavy tailed distributions; maximum likelihood estimation; likelihood ratio tests; AIC; BIC; profile likelihood.
- Multivariate statistical models: covariance; correlation; linear combination; multivariate normal and t distributions; skewed t-distributions; fitting multivariate distributions.
- Copulas: Gaussian copulas; t copulas; rank correlation; tail dependence; inference for copulas; calibrating copulas.
- Time series models: autoregressive models; moving average models; ARMA models; unit root; ARIMA models; FARIMA models; seasonal models; inference; forecasting.
- GARCH models: ARCH; GARCH; APARCH; ARMA/GARCH; inference; forecasting.
- Risk management: estimating VaR, ES, conditional VaR and conditional ES nonparametrically and parametrically; risk aggregation
- Others: Bootstrap methods and nonparametric methods if time permits.

Remarks

- Students exhibiting disruptive behavior, including talking, sleeping, talking on cell phones or disturbing other students will be asked to leave.
- Please advise the instructor if you have a documented disability that needs to be accommodated.
- As members of the academic community, students are expected to recognize and uphold standards of intellectual and academic integrity. See the University’s policy on Academic Honesty (Section 409, http://www2.gsu.edu/~wwfhb/sec409.html) for details.