FINANCIAL ECONOMETRICS

PEKING UNIVERSITY, FALL 2017

BO HU

General Information

Time: 13:00-14:50 Wednesdays every other week (the first starts on 9/13/2017), and 15:10-17:00 Thursdays every week. （单周的5-6节和每周的7-8节）
Location: No. 2 Teaching Building Room 207 （二教207）
Instructor: Bo Hu
Email: bohu@nsd.pku.edu.cn
Website: http://www.econbohu.com/teaching/finmetrics/
Teaching Assistant: TBA

Course Description

Finance is a discipline of strong empirical nature. To answer interesting questions seriously and to evaluate theories and models in finance, formal statistical analysis is required. Financial Econometrics is the study of model-based statistical inference in finance. In this course, we cover essential tools that can be used to analyze financial data and to test market models. Although theories will be reviewed, in this course we focus on the empirical techniques, and will conduct analysis with real finance data. We will introduce a selection from topics on asset return predictability, market microstructure, event-study, the Capital Asset Pricing Model, factor models, consumption-based asset pricing models, volatility, the term structure and high frequency data, depending on the time available.

This course will be taught in Chinese and English. Most of the course materials, including the homework assignments and exams, will be written in English.

Prerequisites

Students are supposed to have taken a course in probability and mathematical statistics, a course in econometrics, and a course in finance. Though not required, basic programming skills could be beneficial.

Textbook

There is no required textbook for this course. I will post my notes on the course website . The following textbooks are for reference.

Brooks, C. (2014). *Introductory Econometrics for Finance*. Cambridge University Press, 3rd edition.

Campbell, J. Y., Lo, A. W., and MacKinlay, A. C. (1997). *The Econometrics of Financial Markets*. Princeton University Press.

Gourieroux, C. and Jasiak, J. (2001). *Financial Econometrics: Problems, Models, and Methods*. Princeton University Press.

Tsay, R. S. (2010). *Analysis of Financial Time Series*. Wiley, 3rd edition.

Computer Usage

This course requires programming. You may use any software package/programming language to solve homework problems. I suggest choosing from Python, R, or Matlab since they are powerful enough to do the work and generate nice plots. Python and R are open source and free. Matlab is not free but student versions are available from the software website.

    I will spend time introducing basic programming skills using Python in class.

Grading

For those who take this course for credit, a final grade will be assigned based on your grades of homework assignments (20%), a midterm exam (30%) and a final exam (50%).

Homework

Please expect five to eight assignments in total. You are encouraged to discuss with other students on these assignments, but make sure you complete your submission by yourself. Please refer to the university's policies on academic integrity.

Exams

The times and locations of the midterm and final exams are listed below. I will not arrange make-up exams. Please note that according to the university's policy, the weights of the exams are determined to avoid passing the course without attending the final exam.

	Weight	Date	Time	Location
Midterm	30%	**11/8/2017**	**13:00-14:50**	In Class
Final	50%	**1/3/2018**	**14:00-16:00**	TBA

Office Hours

The time and location of my office hours are to be announced. The time and location of the TA's office hours are to be announced.

Course Contents

This course will cover a selection of topics from the followings.

1. Introduction
    1.1. An introduction to Financial Econometrics
    1.2. A Brief Review of Probability Theory
    1.3. A Brief Review of Statistics
    1.4. Prices, Returns and Compounding
2. The Predictability of Asset Returns
    2.1. The Efficient Market Hypothesis
    2.2. The Martingale Hypotheses
    2.3. Tests of Random Walk
    2.4. Unit Root Tests
3. Market Microstructure
    3.1. Nonsynchronous Trading
    3.2. The Bid-Ask Spread
    3.3. Modeling Transaction Data
    3.4. Models for Price Change
4. Event-Study Analysis
    4.1. Event Study
    4.2. Measuring Normal Performance
    4.3. Abnormal Returns
    4.4. Cross-Sectional Models
5. The Capital Asset Pricing Model
    5.1. Portfolio Theory
    5.2. Statistical Framework for Estimation and Testing
    5.3. Nonnormal and Non-IID Returns
    5.4. Cross-Sectional Regressions
6. Factor Models
    6.1. Theory
    6.2. Estimation and Testing
    6.3. Risk Premia and Expected Returns
    6.4. Selecting Factors
7. Volatility
    7.1. ARCH and GARCH Models
    7.2. Forecasting Volatility
    7.3. Multivariate GARCH Models
8. Extreme Values, Quantiles, and Value at Risk
    8.1. Value at Risk
    8.2. Quantile Estimation
    8.3. Extreme Value Theory
9. Intertemporal Equilibrium Models
    9.1. The Stochastic Discount Factor
    9.2. Consumption-Based Asset Pricing Models