Course Syllabus: 实证金融学 (Empirical Finance)

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课程简介：
《实证金融学》为高年级本科生课程。通过本课程的学习，学生能够掌握如何运用数据来检验金融学的经典理论，以及了解金融学中常用的计量方法。本课程主要包含“实证资产定价”和“应用计量”两部分。其中，“实证资产定价”部分介绍如何用数据来检验经典的金融理论，例如权益资产定价、投资组合管理、资本资产定价模型、Fama-Macbeth回归方法、套利定价理论，以及分别应用于股票和固定收益证券的多因子模型。“应用计量”部分帮助学生复习基本的计量经济学方法，并进一步介绍常用的时间序列模型和面板数据模型。本课程会特别地关注以上计量方法在经济、金融背景下的应用，以及在实证分析中应注意的问题，包括模型选择、内生性问题的检验和解决方法等内容。

Course Description (course objectives and content):

Empirical Finance is a course for senior undergraduate students who are interested in applying real data to test classical asset pricing theories and in the applications of econometric methods to financial problems. This course mainly contains two parts: “empirical asset pricing” and “applied econometrics”. The first part discusses how to apply real data or simulation methods to test classical financial theories, including equity valuation, portfolio management analysis, CAPM model, Fama-Macbeth regression, Fama-French-Carhart factor model, Arbitrage Pricing Theory, and multi-factor pricing models for fixed income securities.

The second part helps students review basic econometric theory, and further talks about more advanced time-series and panel data models, including ARIMA model, GARCH model, fixed/random effect models, and varying-coefficient models. Specifically, this course focuses on the application of econometric models to real financial or economic problems, for example, this course will cover the difference-in-difference analysis, solving endogeneity problem, model specification and selection issues. Also, after taking this course, students will have a general idea about how to write a research proposal and they should be able to construct appropriate reduced-form models for their topic of interest.

Textbooks & References:

1. Principles of Econometrics. Hill, R. C., Griffiths, W. E. and G. C. Lim, 4th Edition, 2011.
2. Analysis of Financial Time Series, Ruey S. Tsay, 3rd Edition, 2010.

Grading:

- biweekly assignments (20%) + midterm (40%) + final project (40%)
- Students can form groups of size up to 4 people. For each assignment, each group submits one copy of slides which presents the main results, and puts the calculation details as appendix. For the final project, each group just submits one copy of report.
- For assignments and final project, group members are equally graded.

No.	Assessment method	Percentage
1	biweekly assignments	20%
2	midterm	40%
3	final project	40%

Teaching Schedule:

Week	Contents	Assignment Due
1	Preview • Time Value of Money • Discounted Cash Flow Analysis • Interest Rates • Equity Valuation • Mortgage Payments and Amortization Table	
2	Asset Return and Volatility Statistical Characteristics □ Portfolio Management, Efficient Frontier and Capital Market Line □ CAPM model and Security Market Line	
3	Fama-Macbeth Regression Multi-factor Asset Pricing Model • Fama-French-Carhart four factor model • Arbitrage Pricing Theory (APT) • model with security characteristics (e.g. fixed income securities)	Assignment-1
4	Fixed Income Securities #1 • main features of bonds • yield to maturity (YTM) and realized returns • yield curve	
5	Fixed Income Securities #2 • Interest Rate Risk: Duration and Immunization • Arbitrage Pricing • Liquidity Measures • Liquidity Risk and Liquidity Premium	
6	Options and Derivatives #1 • Option Basics • Options: strategies and valuation prior to expiration	Assignment-2
7	Options and Derivatives #2 • Binomial Tree Option Pricing • Black-Scholes-Merton Formula	Assignment-3

8	Review on Econometrics • Cross-Sectional Models: Simple Linear Model, Multivariate Linear Model • OLS Estimation, Heteroskedasticity, Generalized Least Square Estimation • Endogeneity Problem	
9	Time Series Analysis #1 • Stationarity • AR, MA, ARMA, ARIMA models	Assignment-4
10	Time Series Analysis #2 • ARCH, GARCH • VAR, VEC, cointegration (4th P.E. on social security policies)	
11	Panel Data Models #1 • Fixed Effect Model	Assignment-5
12	Panel Data Models #2 • Time Effect Model, Random Effect Model • Dynamic Panel Data Model, Varying-Coefficient Models	
13	Additional Topics-1 □ Causal Inference □ Market Efficiency i) Efficient Market Hypothesis ii) weak/semi-strong/stong form efficiency iii) implications on securities analysis □ Risk Management	Assignment-6
14	Additional Topics-2 • Machine Learning Applications: Lasso, Ridge, ElasticNet • Review on Application of Dummy Variables: Diff-in-Diff, Regression Discontinuity	
15	Group Presentations	
16	Group Presentations	Assignment-7

Shuo LIU

Shuo LIU is currently an assistant professor of Finance in the School of Economics and Management at Tsinghua University.

He received a Ph.D. in Economics from University of California, Los Angeles. During his study at UCLA, he worked as intern at International Monetary Fund, Washington DC, and Federal Reserve Bank at St. Louis.

His research interests include over-the-counter markets, corporate bond pricing, financial intermediation and asset pricing. He teaches empirical finance (undergraduate level), financial economics (undergraduate level), and financial data analysis and application (graduate level).

教师简介：

刘硕于 2020 年加入清华大学经济管理学院，目前担任金融系助理教授。他于 2020 年获得加州大学洛杉矶分校经济学博士。博士在读期间，他曾在美联储圣路易斯分行、国际货币基金组织华盛顿总部等机构进行研究实习。他的研究领域包括柜台交易市场、公司债券定价、金融中介和资产定价。他讲授的课程包括实证金融学（本科）、金融经济学（本科）、金融数据分析方法与应用（硕士）。