KAIST College of Business
Estimation of Asset Pricing Models
FE 587 - Fall 2020

Instructor: Chang Lee
E-mail: chang.lee@gmail.com
Office: SUPEX 330
Office Hours: TBA

Classes
Tue and Thu 9:00am-10:20am, 2nd Half, Location TBA

Course Description
This course introduces students to the empirical research on the cross-section of expected stock returns. Since Eugene Fama and Kenneth French developed the famous three-factor model in their 1993 paper, academic research has identified many financial factors and security characteristics that affect stock returns. Factor models are the workhorse of modern asset pricing research and have inspired various quantitative investment strategies that are now used as mainstream investment tools. In this course, students will learn various factors that move stock prices and empirical approaches used to test the validity of those factors. After this course, student will have a strong understanding of the risk-return patterns in the stock market and will be able to construct investment strategies that exploit the patterns.

The course consists of two main parts: the theory of factor pricing models and the empirical methods to evaluate the models. In the theory part, students study the basic pricing equation that every asset should satisfy and derive the stochastic discount factor. Students also learn how the discount factor formulation leads to the expected return-beta representations of linear factor models common in empirical work. In the empirical method part, students learn how to test these models using time-series and cross-sectional regressions. Finally, the course investigates the variables that have been shown to explain future stock returns and discusses recent developments in empirical asset pricing research.

Prerequisites
Students are expected to have a solid grasp of general finance and investment. A good understanding of statistics, econometrics, and economics is also expected.

Course Materials
The following textbook is *strongly recommended* for this course:

- *Empirical Asset Pricing: The Cross Section of Stock Returns,* First Edition, by Turan G. Bali, Robert F. Engle, Scott Murray, Wiley (BEM hereafter)
    - ISBN-13: 978-1118095041
    - ISBN-10: 1118095049

If you want to read more, the following book provides a thorough review on asset pricing theories, some of which will be covered in the course:

- *Asset Pricing,* Revised Edition, by John H. Cochrane, Princeton University Press (Cochrane hereafter)
    - ISBN-13: 978-0691121376

- ISBN-10: 0691121370

Assignments

There are four assignments in this class. The assignments can be worked in groups of 2-3 people.

- **Assignments 1 to 3**: In the first three assignments, students are asked to replicate the size and value premium results presented in Chapter 10 and 11 of Bali, Engle, and Murray. The goal is to develop a program that estimates the relations between a set of variables and the cross section of future stock returns using the empirical methodologies covered in class. The replication process consists of three steps corresponding to the three assignments. Each assignment builds on the previous assignment so that a comprehensive program is developed by the end of the course. Your group is required to submit the programs and program logs as well as the empirical results.
  - You can choose SAS, R, or Python as the programing language for the assignments. I will use SAS in my lecture notes.

- **Assignment 4**: Each student group will be randomly assigned to a research article that studies recent developments in empirical asset pricing literature in the beginning of the course. Your job is to provide a twenty minute in-class presentation that summarizes the results and techniques of the article and answer audience questions about the paper.

All assignments will be due at the beginning of class on the corresponding deadline. The deadlines for the assignments can be found in the tentative course outline at the end of the syllabus. **Late assignments will NOT be accepted.**

Final

The final exam will be on **Dec 15, Tuesday from 9:00am to 11:30am.** The exam will be based on the materials covered in class. It is closed book.

Grading

40% Assignments (10% each), 60% Final exam

Course Website

I will use the course Dropbox folder to post course materials. The link to the course Dropbox folder is on the KLMS course webpage.

I will use e-mails to post announcements. Please check your school e-mail account daily.

Academic Integrity and Class Conduct

Consistent with the university policy, cheating will be considered a very serious offense. Any student caught in cheating or copying (including plagiarism) will get a zero on the assignment or exam.

Tentative Course Outline

Week 1 (10/27, 10/29):

- Introduction
- BEM
  - The CRSP Sample and Market Factor (Ch. 7)
  - Calculating Market Capitalization (Ch. 9.1)
  - Calculating Book-to-Market Ratio (Ch. 10.1)

Week 2 (11/3, 11/5):

- BEM
  - Portfolio Analysis (Ch. 5)
  - Size and Stock Returns (Ch. 9.5)
  - Book-to-Market Ratio and Stock Returns (Ch. 10.5)

Assignment 1 (11/5)
Assignment 4 (11/5): Research papers will be assigned to groups.

Week 3 (11/10, 11/12):

- Cochrane
  - Asset Pricing Model Overview (Ch. 1.1 – 1.3)
  - Classic Issues in Finance (Ch. 1.4)
  - Expected Return-Beta Representations (Ch. 5.1)
  - Factor Models and Discount Factors (Ch. 6.3)
  - Conditional and Unconditional Models (Ch. 8.3 – 8.4)

Assignment 1 Due on 11/12
Assignment 2 (11/12)

Week 4 (11/17, 11/19):

- Cochrane
  - Regression-Based Tests of Linear Factor Models (Ch. 12)
- BEM
  - Fama and Macbeth Regression Analysis (Ch. 6)

Week 5 (11/24, 11/26):

- BEM
  - Momentum, Idiosyncratic Volatility, and Other Stock Return Predictors (Ch. 11, 15, and 18, skim)

Assignment 2 Due on 11/24
Assignment 3 (11/24)

Week 6 (12/1, 12/3):

- Journal Article
  - Betting Against Beta (Frazzini and Pedersen, JFE 2014)
  - Time Series Momentum (Moskowitz, Ooi, and Pedersen, JFE 2012)

- Empirical Asset Pricing via Machine Learning (Gu, Kelly, and Xiu, RFS 2020)

Assignment 3 Due on 12/1

Week 7 (12/8, 12/10):

- Student Group Presentations on Recent Empirical Evidence on the U.S. Stock Market
  - Frazzini, A., Israel, R., and T. J. Moskowitz, 2012, *Trading Costs of Asset Pricing Anomalies.*
  - Daniel, K., and T. J. Moskowitz, 2016, *Momentum Crashes*, Journal of Financial Economics, 122, 221–247.
  - Asness, C., Frazzini, A., Israel, R., Moskowitz, T. J., and L. H. Pedersen, 2018, *Size Matters, if You Control Your Junk*, Journal of Financial Economics, 129, 479-509.
  - Stambaugh, R. F., Yu J., and Yuan, Y., 2012, *The Short of It: Investor Sentiment and Anomalies*, Journal of Financial Economics, 104, 288-302.
  - R. David Mclean and Jeffrey Pontiff, 2016, *Does Academic Research Destroy Stock Return Predictability?*, Journal of Finance, 71, 5-32.
  - Asness, Cliff, Tobias Moskowitz, and Lasse Pedersen, 2013, *Value and Momentum Everywhere*, Journal of Finance, 68, 929-985.

Assignment 4 Due on 12/8 (Even if your presentation is scheduled on 12/10, you should still submit your ppt file by 12/8)

Week 8 (12/15, 12/17):

FINAL EXAM
12/15, Tue 9:00am – 11:30am