

**FIN512 Empirical Asset Pricing
Autumn 2018
Course Outline and Syllabus**

Contact Information:

Professor Lars A. Lochstoer
Email: lars.lochstoer@anderson.ucla.edu

Description

This course is a PhD level course in empirical asset pricing. The asset pricing field is vast, but we will focus primarily on two core ideas:

1. time-series properties of asset returns (predictability, volatility, correlations with other variables, etc.)
2. cross-sectional properties of asset returns implied by equilibrium asset pricing models (including CAPM, consumption-based asset pricing, factor models, etc.)

We'll also discuss the pricing of equity index derivative securities and recent research on the effects of financial frictions on asset markets. We will use a variety of econometric techniques, including GMM and maximum likelihood, as well as various time-series models. We view these econometric techniques as a way of answering economic questions, rather than being interested in the econometric methodology per se.

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Prerequisites

The course is designed for second year doctoral students in finance. The prerequisites are a PhD level course in theoretical asset pricing, as well as some exposure to econometrics.

Materials

I will distribute lecture notes in class. You are required to yourself download and, if you want, print copies of any journal articles that we will cover. References are given in the back of this document, and I will in class let you know which articles we will focus on for each class.

We will read substantial parts of the following book:

Cochrane, John, 2005, *Asset Pricing: Revised Edition* Princeton, NJ: Princeton University Press

It is referred to as (**AP**) in the reading list.

Other excellent reference books are the following:

Campbell, John Y., Andrew W. Lo, and A. Craig MacKinlay, 1997, *The Econometrics of Financial Markets*, Princeton, NJ: Princeton University Press

Duffie, Darrell, 2001, *Dynamic Asset Pricing Theory*, 3rd Edition, Princeton, NJ: Princeton University Press

Singleton, Kenneth J., 2006, *Empirical Dynamic Asset Pricing*, Princeton, NJ: Princeton University Press

Hamilton, James D., 1994, *Time Series Analysis*, Princeton, NJ: Princeton University Press

You will need access to Matlab, Gauss or some other matrix programming language.

The Reading List includes both classics that you should read at some point and newer material to give you an idea of how people are approaching the subject more recently.

Requirements

There will be a substantial required homework assignment, which will be due by the end of the semester (usually sometime in November). I expect students to spend two weeks on finishing this assignment. Most people do not acquire a deep understanding of empirical issues without actually doing empirical work. Therefore you will be assigned exercises that require dealing with data and estimating models. You are free to use any software available to you to perform this empirical work. Matlab, Stata, and Eviews are recommended.

Class participation is mandatory. You are expected to be prepared to discuss and answer questions related to the required readings.

There will be a final exam at the end of the semester which counts for 55% of the grade. The problem set will count for 35% of the grade. Class participation will account for the remaining 10% of the grade.

Class Schedule

August 20 – 22, 2018: 10:15 to 16:00, room to be determined.

December 11 – 12, 2018: 10:15 to 16:00, room to be determined.

The homework will be handed out by September and is due in the morning of December 11th in class. We will then go through the homework in detail and discuss recent developments in empirical asset pricing such as models with financial frictions and intermediaries in the remainder of the class time on December 11th and 12th.

Tentative Reading List

We may deviate from this reading list. I will let you know about any such deviations in class.

1. The CAPM and an econometric review

a. Bread-and-Butter Empirical Methods: Time-series and cross-sectional regressions

- Any source to review CAPM theory. In AP, it is Ch. 9, but this chapter depends on Chapters 4, 5, and 6 as well.
- Time-series tests: Gibbons, Ross and Shanken (1989). AP Ch. 12.
- Cross-sectional tests: AP pp. 434 - 452.
- Other references: Shanken (1987), Shanken (1992), Black, Jensen, and Scholes (1972), Fama and MacBeth (1973)

b. Landmark critique of the unconditional CAPM

- Fama and French (1992)
- Understanding how portfolio sorts can *obfuscate or highlight* empirical relations

c. Methodology: review of asymptotics for OLS and robust standard errors

- Any graduate-level econometrics textbook (e.g., Hamilton or Cochrane, referenced above)
- This will be very brief, better studied alone—we will focus on practical and intuitive take-aways

2. Multifactor models I: Methodology, linear K-factor models, and anomalies

a. The Fama-French 3-Factor Model and critiques

- Fama and French (1993), Fama and French (2014)
- AP Ch. 9
- Econometric critiques: MacKinlay (1995), Lo and MacKinlay (1990)
- Economically motivated critiques: Berk (1995), Daniel and Titman (1997)
- What can factor models tell us? Kozak, Nagel, and Santosh (2017)

b. General linear factor models

- AP Ch. 13

c. Anomalies and establishing a new stylized fact

- Profitability: Novy-Marx (2013)

- The investment-anomaly and the Fama-French 5-factor model (2014)
- Momentum: Jegadeesh and Titman (1993), Asness, Moskowitz, and Pedersen (2012), Daniel and Moskowitz (2012)
- Liquidity: Pastor and Stambaugh (2003)
- Inattention: Cohen and Frazzini (2008)

d. Factor models and fund performance measurement

- Background reading: Berk and Green (2004)
- Mutual fund performance: Carhart (1997), Fama and French (2010), Berk and van Binsbergen (2015)
- Hedge fund performance: Fung, Hsieh, Ramadorai, and Naik (2008), Coval and Jurek (2015)

3. Time-series properties of aggregate returns and dividends: Predictability

- AP Ch. 20.1
- *Excess return volatility and predictability*: Shiller (1981), Fama and French (1989)
- *Present-value methods I*: Campbell and Shiller (1988), Lettau and Ludvigsson (2001a)
- *Statistical small-sample issues*: Hodrick (1992), Stambaugh (1999)
- *Out-of-sample performance and parameter stability*: Boudoukh, Michaely, Richardson, and Roberts (2007), Ang and Bekaert (2006)
- *Present-value methods II*: Cochrane (2011). *Other references*: Cochrane (2008), Pastor and Stambaugh (2009), van Binsbergen, Brandt and Koijen (2010), Kelly and Pruitt (2013)
- *What Drives Anomaly Returns? A cross-sectional approach applying present-value methods to anomaly portfolios*: Lochstoer and Tetlock (2017)

4. Conditional factor models and market timing

- AP Ch. 8.
- Conditional (C)CAPM: Lettau and Ludvigsson (2001b)
- Critiques: Lewellen and Nagel (2006), Daniel and Titman (2012), Nagel (2012)
- Putting it together; Characteristics vs. Beta-Pricing: Lochstoer and Tetlock (2017)
- Other references: Jagannathan and Wang (1996), Ferson and Harvey (1999)

5. Methodology: GMM tests of models with an observable stochastic discount factor

- Hansen and Singleton (1982)
- AP Ch. 10, 11
- Other references: Hansen, Heaton and Yaron (1996)

Required reading (although you do not need to follow in detail all of the math in the Hansen papers, especially when nonnegativity is imposed). The Jagannathan and Wang paper was suggested reading earlier in the semester. Here it is included because it develops an estimation methodology for the HJ-distance.

- Hansen and Jagannathan (1991)
- Hansen and Jagannathan (1997)
- AP The material on H-J bounds in Chapter 5, and Chapters 13 - 16 (they are short chapters)
- Jagannathan and Wang (1996)
- Hodrick and Zhang (2001)
- Parker and Julliard (2005)

We will not discuss this related paper. It works out the econometrics of the HJ-distance when the null is that the econometrician has the wrong stochastic discount factor.

- Hansen, Heaton, and Luttmer (1995)

6. Volatility

- Schwert (1989): what explains aggregate stock return volatility?
- Ang, Hodrick, Xing, and Zhou (2006, 2009): the idiosyncratic volatility puzzle
- Bollerslev, Tauchen, and Zhou (2007): the variance risk premium
- Becker, Giglio, Le, and Rodriguez (2016): risk and returns across the variance swap curve
- Broadie, Chernov, and Johannes (2009): are OTM puts overpriced?
- Volatility and risk premium together: The time-series of the conditional market Sharpe ratio: Lettau and Ludvigson (2010)

7. Financial Frictions and Limits-to-Arbitrage

Some background theory: Bernanke and Gertler (1989; agency costs, imperfect contracts, and business cycle fluctuations), Shleifer and Vishny (1997; limits to arbitrage), Kyotaki and Moore (1997; borrowing constraint related to market value of collateral in business cycle model), Brunnermeier and Pedersen (2008; funding liquidity, margin constraints).

- Pro-cyclical leverage of financial intermediaries: Adrian and Shin (2010)
- Broker-Dealer leverage growth and the cross-section of stock returns: Adrian, Etula, and Muir (2013)
- Betting on Beta: Frazzini and Pedersen (2013)
- Embedded leverage: Frazzini and Pedersen (2013)
- Speculators and Hedgers in commodity markets: Acharya, Lochstoer, and Ramadorai (2013).
- Financial Crisis and Financial Markets: Muir (2016)
- The Fed and the Stock Market: Lucca and Moench (2015)

- Stambaugh, Yu, and Yuan (2013): limits-to-arbitrage and shorting as an explanation for the idiosyncratic volatility puzzle?
- Drechsler and Dreschler (2016): shorting and limits-to-arbitrage as a pervasive anomaly-explanation?