Nova—PhD in Finance

Advanced Topics in Finance (Asset Pricing I)

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2024–2025

1 Presentation

This is the syllabus for the course Advanced Topics in Finance (Asset Pricing I).

1.1 Course Description

The topics and approach of this class combine macroeconomics and finance, with an emphasis on developing and testing theories which involve linkages between financial markets and the macro economy. This course is based on three ideas:

1. First, returns are not random walks but are predictable over business cycle and longer horizons. Thus, we need macroeconomic models that generate predictability - through time-varying risk aversion for example - and appropriate empirical methods to estimate them.

2. Second, all financial assets can be understood using a stochastic discount factor M and a description of their payoff X. The price P of a financial asset is then

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simply $= E(MX)$. Macroeconomic models give us ideas about the form of the stochastic discount factor M. GMM estimators give us a natural framework to test these ideas.

3. Third, time varying risk premium dramatically changes portfolio theory, leading to new computing issues and solutions to old Merton problems.

This course is thus a survey of both asset pricing theory and empirical methods. We will cover the modern stochastic discount factor approach to asset pricing theory, with applications to stocks, bonds and currencies (both fiat and crypto). We will cover empirical methods, including how to evaluate asset pricing models and how to evaluate forecasting techniques. We will go back and forth between macroeconomic and financial theories and empirical tests of these theories.

The course is designed for students who are interested in asset pricing, macro-finance and financial economics.

- I will assume you have a good knowledge of basic finance facts, instruments and results. To check your memory and knowledge of basic finance you can skim through a set of lectures notes prepared by John Cochrane. Basic concepts, such as the notion of present value, definition of return and yield to maturity, should be well understood.

- There will be computational problems and replication exercises covered in class. I strongly recommend Python (or similar software, as Matlab), and hints or illustration of the problems will be provided in Python or Matlab code. Various tutorials can be found online. For example: Ian Cavers' An Introductory Guide to Matlab at UBC, Matlab Summary and Tutorial at Florida University, Edward Neuman's Matlab Tutorials at Southern Illinois University, Kermit Sigmon's Matlab Tutorial at Utah University. Also, you can refer to the Appendix at the end of Miranda and Fackler (2004), which is a great book on computational

methods based on Matlab. For Python, a great reference is Hilpisch (2016). To learn Python with economics applications, the best reference is Thomas Sargent's website quantitative economics.

1.2 Textbooks

The following textbook is *highly recommended*: Cochrane (2005). One big survey should be read over the course of the class: Cochrane (2017). The following textbooks are useful additional references: Campbell (2017), Singleton (2006) and Campbell et al. (1997). Additional non-required excellent surveys are: Cochrane (2006) and Campbell (1999). An excellent intermediate textbook you can refer to if you want to review intermediate topics in finance is Danthine and Donaldson (2014).

2 Course Outline

The following pages detail the theoretical and empirical topics that will be covered in class with a tentative program. Lecture notes and/or slides on each topic (with additional references), published articles and working papers will be available on a dedicated class webpage.

Consumption-based Asset Pricing (I/II)

- Utility-based asset pricing: Stochastic discount factor; Prices, payoffs and returns
- Risk-free rates: Certainty case; Uncertainty case
- In class discussion and applications.

Required reading: Cochrane (2005), chapter 1-2.

Additional readings: Campbell and Shiller (1988), Lucas Jr (1978) Cochrane (2008), Cochrane (2011)

Consumption-based Asset Pricing (II/II)

- Risky assets: Risk correction; Idiosyncratic risk; Expected return-beta representation and market price of risk; Mean-variance frontier; Equity premium puzzle; Random walks and time-varying expected returns
- Contingent Claims: Definition; Risk-neutral probabilities; Risk sharing; State diagram and price function; Discount factors: Law of one price and existence of discount factor; No arbitrage and positive discount factors
- In class discussion and applications.

Required reading: Cochrane (2005), chapter 3-4.

Additional reading: Hansen and Jagannathan (1991), Hansen and Richard (1987).

New Facts in Finance

- Stylized facts about asset pricing and returns in the time-series and in the cross-section.

Required readings: Cochrane (1999) and Fama and French (1996).

Further (non required) readings and material: Jordà et al. (2019); Fama's Nobel lecture (link to video); Cochrane's blog post about Fama's Nobel Prize.

Models I

- Heterogenous Agent Models
- Disaster Risk Models
- In class discussion and applications.

Required reading: Constantinides and Duffie (1996), Barro (2006)

Additional reading: Gourio (2012).

Models II

- Campbell and Cochrane (1999)'s Habits Model: Preferences; Risk-free rates; Key mechanism;
- Simulation: Fixed-point method; Series method; Extensions: Bonds; Exchange rates
- Long-run risk models (only sketch)
- In class discussion and applications.

Required reading: Cochrane (2005) chapter 21.2; Campbell and Cochrane (1999).
Additional readings: Wachter (2006), Verdelhan (2010), Epstein and Zin (1991), Bansal and Yaron (2004), Bansal et al. (2005), Piazzesi and Schneider (2006).

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