1 Course objectives

This course provides an overview of the field of asset pricing. The emphasis of this course is on the theoretical underpinnings of the field and the evaluation of models built to address the empirical regularities observed in the US (and to some extent international) securities data. The emphasis will largely be on discrete-time models, though we will deal with continuous-time methods in some places. The topics covered include: the law of one price and the stochastic discount factor, consumption asset pricing, recursive preferences, habit formation, market frictions and transaction costs, issues in fixed income and currency pricing, empirical evidence on stock returns, and models with asymmetric or limited information.

This is not an econometrics course, nor an empirical asset pricing course. We will cover empirical results to the extent that they provide context for the theory. We will also work with data (a little bit) when it helps to elucidate theoretical concepts. Finally, we will do numerical analysis of some of the models we cover, which will require some programming. The numerical analysis and/or solution of models is so standard in the field, that you might as well get used to these tools at an early stage.\(^1\)

The course is designed for second year doctoral students in finance. Economics doctoral students and other finance doctoral students are also welcome. Other students may take this course if they have previously taken at least one PhD-level finance course on asset pricing and one PhD-level course on statistics or econometrics.

\(^1\)I recommend either R or Python. Matlab is a good choice also, but it isn’t an open source package, which is probably a disadvantage in the long-term.
2 Topics

The early lecture topics are largely fixed, but the content of the later lectures may change as the semester progresses.

1. Introduction

- Overview of course topics
- Arrow-Debreu state prices with finite states
- Development of Euler equation and kernel representation
- Connection to CAPM
- Empirical review

References


2. Law of one price and principle of no-arbitrage

- Kernel representation: $P(x) = E[m^*x]$
- Hansen-Jagannathan bounds
- SDF and the mean-variance frontier

References


3. Consumption asset pricing

- Dynamic programming
- \( m^* \sim U'(c) \)
- The consumption CAPM
- The equity premium puzzle
- The term structure of interest rates

References


4. Recursive preferences

- Separating risk aversion and intertemporal substitution
- Epstein-Zin
- Bansal-Yaron – risks for the long-run

References
5. Habit formation

- External habit model of Campbell and Cochrane
- Brief introduction to continuous time methods

References


6. Examining the mechanism

- Euler equation errors
- Dividend strips
- Value and growth firms: a reduced form sdf approach

References


7. Market frictions

- Transaction costs
- Incomplete markets
- Uninsurable income heterogeneity

References


*** PRELIMINARY PAST THIS POINT ***

8. Disaster risk [AND VARIANCE DECOMPOSITION?]

- Rare economic disasters and the equity premium
- Disasters and consumption recoveries

References


9. Cross-section of stock returns

- $m \to$ Beta and Factor model $\to m$
- CAPM
- Empirical issues: Gibbons, Ross, Shanken and Fama-MacBeth
- Other effects: size and book-to-market
- APT and ICAPM
- Fama-French 3 factor model and the intercepts test
  - Distribution of HML
- Daniel and Titman – characteristics sorts
- Momentum
  - Distribution of UMD
- Reversals
- Other asset classes and international evidence
- The five-factor model
- Conditional asset pricing [?]
  - Log-linearization and variance decompositions
  - $cay$ consumption to wealth ratio
  - Time variation in betas

References


Linnainmaa and Roberts, 2016, “The history of the cross-section of stock returns”


10. Fixed income and currencies

- Fixed income models

References


- Currencies

References


- International investing: Brusa, Ramadorai, and Verdelhan (2017) [tentative]

11. Leverage and financial intermediation

- Preference heterogeneity: Longstaff and Wang
- Belief heterogeneity: Fostel and Geanakoplos
- Financial intermediaries: He and Krishnamurthy

**References**


12. Information

- Informational asymmetry
  - Implications for trading volume and momentum
- Capacity constraints
- Empirical evidence

13. Student presentations

- Students can choose to present one of the following papers.
- If you’d like to present a paper not on this list, that may be okay as well, but you have to run the paper by me first.
- In the presentation, you should focus on the paper’s modeling contribution and any empirical tests related to this. Papers contain more material than you will be able to present in 30-40 minutes, so you need to identify the paper’s key contribution and focus on explaining its logic to the class.

**References**


## 3 Materials

The course is self-contained and not based on any one book. John Cochrane’s book *Asset Pricing* comes closest to the course in terms of topics. You may also find useful:

- Ljungqvist and Sargent, *Recursive Macroeconomic Theory* for coverage of dynamic programming, as well as two excellent chapters on asset pricing.

- Duffie, *Dynamic Asset Pricing* for continuous time methods.


## 4 Logistics

### Office hours and TA

Office hours are by appointment. Please email me first (hm2646@columbia.edu). Our TA will be Aref Bolandnazar (MBolandnazar200@gsb.columbia.edu). He will have office hours on Mondays from 4–5:30, in a room that he will post weekly.

### Grading

There will be 6 homeworks which will represent 40% of the grade and an in-class final with is worth 60% of the grade.
<table>
<thead>
<tr>
<th>Class</th>
<th>Fall 2017</th>
<th>Topic</th>
<th>Assign</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fri Sep 08</td>
<td>Introduction: CAPM, SDF, empirical evidence</td>
<td>1</td>
<td>Fri Sep 22</td>
</tr>
<tr>
<td>2</td>
<td>Fri Sep 15</td>
<td>Law of one price and the stochastic discount factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Fri Sep 22</td>
<td>Consumption asset pricing</td>
<td>2</td>
<td>Fri Oct 06</td>
</tr>
<tr>
<td>4</td>
<td>Fri Sep 29</td>
<td>Empirical evidence on standard model and recursive preferences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fri Oct 06</td>
<td>Recursive preferences and long-run risks</td>
<td>3</td>
<td>Fri Oct 27</td>
</tr>
<tr>
<td>6</td>
<td>Fri Oct 13</td>
<td>Habit formation and continuous time basics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Fri Oct 27</td>
<td>Applications: Euler errors and equity dividend strips</td>
<td>4</td>
<td>Fri Nov 10</td>
</tr>
<tr>
<td>8</td>
<td>Fri Nov 03</td>
<td>Frictions, transaction costs, and incomplete markets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fri Nov 10</td>
<td>Disaster risk; Model dynamics and conditional betas</td>
<td>5</td>
<td>Fri Nov 17</td>
</tr>
<tr>
<td>10</td>
<td>Fri Nov 17</td>
<td>Fixed income and currencies; Student presentations</td>
<td>6</td>
<td>Fri Dec 01</td>
</tr>
<tr>
<td>11</td>
<td>Fri Dec 01</td>
<td>Student presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Fri Dec 08</td>
<td>In class final exam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Class schedule.

**Class schedule**

Classes are held Fridays from 2:15-5:30pm in 329 Uris, with a 15 minute break in the middle. NOTE: The first class will run from 1:30-4:45pm. Table 1 shows the class dates, the anticipated class topics, and the assignment due dates.

**Assignments**

There will be 6 homeworks, roughly one every two weeks. There will be a handout with many questions (and solutions) that I will give out at the end of the semester. This will be good practice for the final exam. The following are the topics of the homework assignments:

1. Stochastic discount factor
2. Dynamic programming
3. Bonds and generalized preferences
4. Habits and long-run risks
5. Frictions and other issues
6. Student presentations, or fixed income and currencies