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, measuring cash flow and discount rate news, market frictions and transaction costs, disaster risk models, empirical evidence on stock returns, and issues in fixed income and currency pricing.

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. Numerical analysis 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.

¹I 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 Materials

The course is self-contained and not based on any one book. The one that comes closest:

* John Campbell’s (fantastic) new book called *Financial Decisions and Markets* (henceforth FDM).

The following books are directly relevant in parts. Cochrane’s book is very close to the early part of the course flow.

- John Cochrane’s book *Asset Pricing* deals with many of the theoretical underpinnings of the course – SDF’s, Hansen-Jagannathan bounds, Euler equations – but spends less time on the newer extensions of the standard model, like habits, recursive preferences, and so on. If you get only two books, get this one and Campbell’s.

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

The following books are useful references:


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


- Stokey and Lucas with Prescott, *Recursive Methods in Economic Dynamics* is the classic book on dynamic programming in economics. The presentation in Ljungqvist and Sargent is much more readable, but L&S simply refer the reader here for most of the technical details.

3 Topics

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: \( P(X) = E[MX] \)
• Hansen-Jagannathan bounds
• SDF and the mean-variance frontier

References


3. Consumption asset pricing

- Dynamic programming
- $M \sim U'(C)$
- The consumption Euler equation
- The equity premium puzzle
- Bond pricing introduction
- Empirical failure of the standard model

*References*


4. Recursive preferences

- Separating risk aversion and intertemporal substitution
- Epstein-Zin preferences
- Campbell’s version of the ICAPM and good beta-bad beta

*References*
5. Long-run risks

- Bansal-Yaron paper
- Log-linear approximation of the pricing kernel
- Empirical evidence and applications

References


6. Habit formation

- External habit model of Campbell and Cochrane
- Introduction to continuous time methods
- External habit model of Menzly, Santos and Veronesi

References


7. Discount rate and cash flow innovations

- Log-linearization of the returns $R_{t+1}$ equation
- Value and growth firms: a reduced form SDF approach
- Dividend strips
- Euler equation errors

References


8. Market frictions

- Transaction costs, incomplete markets, uninsurable income heterogeneity, and empirical evidence

References


- Disaster risk (and dynamic models of disaster risk?)

References


9. Properties of the pricing kernel


10. Fixed income and currencies

- Fixed income models

References


• Currencies

References


11. Student presentations

• Students will form groups and submit a ranked list of 3 papers that they would like to present. I will assign papers to groups from their lists.

• In the presentation, you should focus on the paper’s modeling contribution and any empirical tests related to this. Make sure to go over the important derivations in the paper (try not to skip steps so your classmates will understand the material). Some papers have sections dealing with continuous time models – you can skip over these (or discuss them if you feel comfortable). Each group will have 1 hour to present. People are allowed to ask questions during the talk. If possible, please leave 5-10 minutes for Q&A at the end.

References


In you choose this paper you should give an overview of the Campbell (1993) model discussed in Section III.


If you present the Gabaix paper, you can focus on the part that deals with power utility. The part on Epstein-Zin preferences (in Section V) can be skipped.


12. Relevant material that we will not cover this semester:

- Empirical tests of consumption-based pricing theories with consumer heterogeneity

References


- Further insights from log-linearization

**References**


## 4 Logistics

**Class schedule**

Classes are held Fridays from 2:15-5:30pm in Uris 331, with a 15 minute break in the middle. What better way to kick off the weekend than with 3 hours spent pondering asset pricing? Table 1 shows the class dates, the anticipated class topics, and the assignment due dates.

**Office hours and TA**

Office hours are by appointment. Please email me first (*hm2646@columbia.edu*). Our TA will be Aref Bolandnazar (*MBolandnazar20@gsb.columbia.edu*). He will have office hours on *(TBD)*, in a room that he will post weekly.

**Grading**

There will be 6 homeworks (the last homework may be replaced with an in-class presentation) which will represent 40% of the grade and an in-class final with is worth 60% of the grade. Homeworks will go out roughly every two weeks. Tentative homework topics are in Table 2.
**Student presentations**

We will devote parts (perhaps all) of the final two classes to students presentations of published research papers that build on concepts we will have covered in class. Presentations will be done in groups of three people. Those presenting will not have to hand in homework 6, but will still be responsible for understanding the material homework 6 covers.

**Final exam**

We will have an in-class three hour final. 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. In the past, we have been able to allow more time for the final for students who did not finish in three hours (though the exam is intended to take less than three hours, I don’t want people to get stressed because of time pressure).
Table 1: **Schedule.** †HW6 to be handed in only by those not doing in-class presentations.

<table>
<thead>
<tr>
<th>Class</th>
<th>Fall 2018</th>
<th>Topic</th>
<th>Assign</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Fri Sep 07</td>
<td>Introduction: CAPM, SDF, empirical evidence, writing good code</td>
<td>1</td>
<td>Fri Sep 21</td>
</tr>
<tr>
<td>02</td>
<td>Fri Sep 14</td>
<td>Law of one price and the stochastic discount factor</td>
<td></td>
<td></td>
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<tr>
<td>03</td>
<td>Fri Sep 21</td>
<td>Consumption asset pricing</td>
<td>2</td>
<td>Fri Oct 05</td>
</tr>
<tr>
<td>04</td>
<td>Fri Sep 28</td>
<td>Empirical shortcomings of the standard model; recursive preferences</td>
<td></td>
<td></td>
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<tr>
<td>05</td>
<td>Fri Oct 05</td>
<td>Recursive preferences and long-run risks</td>
<td>3</td>
<td>Fri Oct 26</td>
</tr>
<tr>
<td>06</td>
<td>Fri Oct 12</td>
<td>Habit formation and continuous time basics</td>
<td></td>
<td></td>
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<tr>
<td>07</td>
<td>Fri Oct 26</td>
<td>Assumptions about discount rate and cash flow innovations</td>
<td>4</td>
<td>Fri Nov 09</td>
</tr>
<tr>
<td>08</td>
<td>Fri Nov 02</td>
<td>Market frictions, incomplete markets, and disaster risk</td>
<td></td>
<td></td>
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<tr>
<td>09</td>
<td>Fri Nov 09</td>
<td>Fixed income and currencies</td>
<td>5</td>
<td>Fri Nov 30</td>
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<tr>
<td>10</td>
<td>Fri Nov 16</td>
<td>Currencies and student presentations</td>
<td>6†</td>
<td>Fri Nov 30</td>
</tr>
<tr>
<td>11</td>
<td>Fri Nov 30</td>
<td>Student presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Fri Dec 07</td>
<td>In class final exam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: **Homework topics.**

1. Stochastic discount factor  
2. Dynamic programming  
3. Bonds and generalized preferences  
4. Habits and long-run risks  
5. Disaster risk and log-linearization  
6. Fixed income and currencies