1 The Course\(^1\)

Asset Pricing is the process by which the prices of financial assets are determined and the resulting relationships between expected returns and the risks associated with those returns. In this class we will study the major theoretical models in discrete time Asset Pricing. While some mathematical derivations are necessary, the emphasis will be on understanding the intuition underlying the model, and what it means for asset pricing in reality.

More importantly, we will also examine what happens when the assumptions underlying models do not hold. This will be done through simulation studies. You will be required to learn how to conduct simulation experiments using software of your choice (R/Matlab/Gauss). This will involve a substantial investment of your time learning how to code. Learning to code is a frustrating, but ultimately rewarding, experience.

There are two goals for the course. First, to provide students with a theoretical framework they can apply to help break down and understand the complicated asset pricing problems faced by academics and practitioners. Second, to provide students with the technical skills necessary for a career in finance. Both sets of skills will be developed through classroom lectures, homework assignments, and in-class presentations and discussions. The workload will be heavy, with a minimum of 10 hours per week required outside the classroom hours.

2 Class Meetings

I expect that students read all assigned readings before class. Students are responsible for all announcements made in class. Some classes will be focused on constructing and analyzing

\(^1\) Thanks to Scott Cederburg and Mike O’Doherty for providing extensive comments and suggestions on the topics to be covered in this class.
simulated economies. Any students with Laptop computers are encouraged to bring them to class. All cell phones must be switched off prior to the start of class.

3 Course resources

Powerpoint Slides and Research Papers: Available from course website

There are three papers included in the course packet that will be useful either as background or as a review at the end of the class.

**Campbell (1999)** Asset Pricing at the Millennium

**Cochrane (1999)** New Facts in Finance

**Cochrane (1999)** Portfolio Advice for a Multifactor World

There are two text books required for this class:

**Sharpe (2007)** Investors and Markets (Princeton University Press): Sharpe is able to provide simple examples to illustrate the key points of many asset pricing models. This book is very insightful and does not have a high math content. Sharpe emphasizes the importance of using simulations to understand how and when models work.

**Cochrane (2001, 2004)**, Asset Pricing (Princeton University Press): Cochrane provides a rigorous treatment of consumption based asset pricing models. This is a valuable book that you will use in both theoretical and empirical asset pricing. The mathematical content is substantially greater than that in Sharpe.

In addition, I would also strongly recommend that you have access to a copy of:

**Copeland, Weston, and Shastri**, Financial Theory and Corporate Policy (Addison-Wesley): This book covers both investments and corporate finance. I find it to be an excellent source of information, providing a detailed discussion of many topics in finance.

4 Course Evaluation

Your final grade will be based on group assignments, presentations and class participation. These items will be weighted according to the following schedule:

<table>
<thead>
<tr>
<th>Individual Classroom Contribution</th>
<th>20%</th>
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<tbody>
<tr>
<td>Group Assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Student Presentations</td>
<td>20%</td>
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</tbody>
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Individual Classroom Contribution:

Class participation is an important part of the course. I consider such things as asking thoughtful questions, attendance, respecting your fellow classmates’ views on particular issues, contributing to a positive atmosphere in the class, and preparation for the scheduled lecture topic as class participation.

Group Assignments:

You will be asked to form study groups of two or three students to complete the homework assignments. Groups should be formed by the end of the first class meeting. To help reduce problems due to free-riding, group members will be asked, near the end of the semester, to evaluate the participation of other group members. This confidential evaluation may affect the individual grade obtained for the group assignments.

Each group will be asked to hand in one set of answers for each assignment. Late assignments will not be accepted except for the most serious of reasons. I expect the assignments to be written up in a professional manner, using Word, Latex, LyX, Scientific Word, Powerpoint etc.

5 Other policies

Fairness:

I strive to treat students with dignity and fairness and to be particularly sensitive to the diversity that exists within the student body. No discriminatory remarks should be with regard to gender, race, age, ethnicity, sexual orientation, or disability. If you have a disability that may require some modification of seating, testing, or any other class requirement, please let me know as soon as possible so that appropriate arrangements can be made. Additional assistance is available from the Office of Disability Services for Students.

Absences and Late Assignments:

As a matter of courtesy, I would appreciate an email or phone message if you unable to attend class.
Late assignments will not be accepted for credit, except for the most serious of reasons. Absence from exams will not be excused, except for the most serious reasons.² Such serious

² Students are allowed to make up examinations which have been missed due to illness, mandatory religious obligations, University activities, or other unavoidable circumstances.
circumstances must be validated in writing by an appropriately accredited professional (e.g. medical doctor). Any unexcused absences will result in a grade of zero.

**Contacting the Instructor:**

Emails should ONLY be used for matters related to COURSE ADMINISTRATION. I will NOT answer technical questions via email. I am happy to discuss issues of concern to you on an individual basis during office hours. If you are unable to attend regular office hours an individual appointment can be set up. I ask that you let me know the subject matter so that I can be prepared. Typically I schedule 20 minute appointments, but if you need more time, we can arrange it.

**Appeals:**

Grading errors should be corrected. Appeals must be in writing and include a description of the question that needs to be re-examined as well as an explanation of why the original grade was incorrect. In general, the entire document will be checked for grading errors, and correcting any errors could either raise or lower the overall score.

**Academic Misconduct:**

*It is my sincere hope that no student in this class submits work that is not his or her own. If I determine that any assignment was not written solely by the student whose identification number appears on the assignment, the student will be reported to the Academic Integrity Review Committee which recommends appropriate sanctions to the Office of Student Conduct. There will be no exception to this rule. Please visit the following website for more information on the University's Code of Academic Integrity and possible sanctions:* [http://academicintegrity.rutgers.edu/integrity.shtml](http://academicintegrity.rutgers.edu/integrity.shtml).

**Grievance Policy:**

Student concerns regarding this course should first be discussed with me, the faculty member teaching this course. If we can't resolve the complaint, you may contact the Chair of the Finance and Economics Department, Professor Ivan Brick, 973-353-5155, ibrick@andromeda.rutgers.edu.

**6 Tentative Course Schedule**

**Week 1: 19th Jan**

**Lecture:** Asset Pricing Theory: An Introduction

**Topics:** The purpose of capital markets
Uncertainty and Risk
Market Efficiency

**Required Reading:** Copeland, Weston and Shastri (2005) Chapter 1

**Homework:** Download and Install R (Matlab if you prefer). Read introduction to R.

R is free statistical software available online at: [http://www.r-project.org/](http://www.r-project.org/). R is widely used and has similar features to Matlab and Gauss. I will be able to help address programming problems in R, but not Matlab or Gauss.

**Week 2: 26th Jan**
**Lecture:** Preferences, Utility, and Risk Aversion

**Topics:** Preferences and Utility functions
Uncertainty and risk aversion
Prospect Theory
Common Utility Functions in Finance

**Required Reading:** Copeland, Weston and Shastri (2005), Chapter 3
Kahneman and Tversky (1979) Prospect Theory: An Analysis of Decision Under Risk

**Homework:** Problem Set 1, due at start of class on 2nd Feb

**Week 3: 2nd Feb**
**Lecture:** State Preference Theory

**Topics:** The Investor’s Problem
Pure Securities
First Order conditions and the Stochastic Discount Factor
Risk, Returns, and the CAPM

**Required Reading:** Copeland, Weston and Shastri (2005), Chapter 4
Cochrane (2001), Chapter 1 (1.1 – 1.4), Chapter 2, Chapter 3 (3.1 – 3.4)

**Homework:** Problem Set 2 due at start of class on 9th Feb

**Week 4: 9th Feb**
**Student Presentation:** Derivation of the CAPM (SDF Approach)
Lecture: State Preference Theory: Incomplete Markets

Topics: In reality markets are incomplete. Does it matter?
Solving the investor’s problem with incomplete markets.
Calculating reserve prices, demand and supply
Introduction to programming in R
Required Reading: Sharpe (2007), Chapters 1, 2, and 3
Cochrane (2001), Chapter 1 (1.1 – 1.4), Chapter 2, Chapter 3 (3.1 – 3.4)

Homework: Developing R (or Matlab) code to simulate an economy in which agents trade until a financial equilibrium is reached. Use the example from the lecture for all model inputs.

Week 5: 16th Feb
Lecture: Portfolio Theory: Mean-Variance
Help Session for Programming – Bring laptops and codes etc.

Topics: Portfolio Allocations
Efficient Portfolios
Optimal Portfolios

Homework: Developing R (or Matlab) code to simulate an economy in which agents trade until a financial equilibrium is reached. Use the example from the lecture for all model inputs.

Week 6: 23rd Feb

Topics: Portfolio Allocations
Investors and firm-specific risk
Different utility functions, different allocations and prices

Homework: Problem Set 3 due at the start of class on 2nd March

Week 7: 2nd March
Student Presentation: Derivation of the CAPM in a mean-variance framework

Lecture: Complete vs Incomplete Markets

Topics: Complete, incomplete, and sufficiently complete markets
Price per Chance and the Pricing Kernel
Individual and Aggregate Consumption

Required Reading: Sharpe (2007), Chapter 4 pages 63 - 78
Homework: Problem Set 4, due at start of class on 9\textsuperscript{th} March

Week 8: 9\textsuperscript{th} March
Lecture: Asset Pricing Models

Topics: The Law of One Price
   The Basic Pricing Equation
   Deriving measures of market risk
   Is beta the most appropriate measure of market risk?
   Sharpe Ratios and the CAPM.
   People disagree. Does it matter?
Asset Prices and uncertain predictions
Unbiased and uncertain predictions
Biased and uncertain predictions

Required Reading: Sharpe (2007), Chapter 4 page 78 – 109, and Chapter 5

Homework: Problem Set 5, due at start of class on 23\textsuperscript{rd} March

Week 9: 23\textsuperscript{rd} March
Student Presentation: Nonmarketable Assets and the Determination of Capital Asset Prices in the Absence of a Riskless Asset

Lecture: Salary, Collateral, Asset Prices and Portfolios

Topics: The Role of labor income in asset pricing
   Outside income correlated with asset returns
   Outside income not correlated with asset returns
   The Role of Age and Human Capital
   Bankruptcy and Asset Prices

Required Reading: Sharpe (2007), Chapter 5
   Mayers (1973) Nonmarketable Assets and the Determination of Capital Asset Prices in the Absence of a Riskless Asset

Homework: Problem Set 6, due at start of class on 30\textsuperscript{th} March

Week 10: 30\textsuperscript{th} March
Student Presentations covering:
   1) The Equity Premium Puzzle  2 slides
   2) Hansen and Jagannathan Bounds  5 slides
3) Epstein Zin Utility 5 slides
4) Habit Formation 5 – 10 slides
5) Junior Can’t Borrow: A New Perspective on the Equity Premium Puzzle 15 – 20 slides

**Required Reading:** Cochrane (2001), Chapter 21

**Week 11: 6th April**
**Student Presentations covering:**

**Required Reading:** Bansal and Yaron (2004) Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles

**Week 12: 13th April**
**EXAM in class**

**Week 13: 20th April**
**Lecture and Class Discussion:** Cross-Sectional Tests of the CAPM

**Topics:** Empirical Predictions of CAPM
Problems testing the CAPM
Classical Two-Step Tests
Portfolios as Test Assets
Firms as Test Assets
A Bayesian Perspective

**Required Reading:**
Fama and MacBeth (1973) Risk, return and equilibrium: Empirical tests
Lewellen, Nagel, and Shanken (2010) A skeptical appraisal of asset pricing tests
Davies (2010) A cross-sectional test of the CAPM at the firm level.

**Homework:** Problem Set 7, due at start of class on 27th April
**Week 14: 27th April**

**Lecture and Class Discussion:** Time Series Tests of the CAPM

**Topics:** Empirical Predictions of CAPM
- Portfolios as Test Assets
- Firms as Test Assets
- A Bayesian Perspective

**Required Reading:**
- Lewellen and Nagel (2006) The conditional CAPM does not explain asset pricing anomalies
- Fama and French (2008) Dissecting Anomalies
- Cederburg, Davies, and O’Doherty (2010) Examining anomalies at the firm level

**Homework:** Problem Set 8, due by 30th April