

Ec 445: Economics of Risk and Financial Markets Spring 2010

Instructor

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Office hours. I have an open-door policy: you can drop by, and if I am in, I will usually be able to talk. (My regular hours are roughly 10am-7pm, and I have another class 11-12:30 on Tu and Th). If you want to talk for a long time, you may want to send me an email to make an appointment. I have official office hours, meaning I will be in my office at the following times for sure (except for some days when I travel, which I will announce on Courseinfo/by email): Tuesdays, 3:30 to 5pm, and Wednesdays, 2 to 3pm

Logistics

Lectures Tu-Th 2-3:30 in room GCB 205

First class: Thursday, Jan 14

Last class: Thursday, April 29

No class on Tu, Feb 16 and Th, April 22 (substitute monday schedule), and on Tu March 9 and Th March 11 (spring break). I may also have to cancel or reschedule a class in the last week (Tu April 27 or Th April 29). Total = 27 classes.

Course Overview

This is an advanced undergraduate class on the economics of risk and uncertainty. We will apply economic and statistical tools to the study of financial markets. After a short math/stats/econometrics review, we will consider static models of uncertainty. Next, we consider dynamic models, first without uncertainty, then with uncertainty. Last, we will study options. Topics include expected utility, arbitrage pricing, portfolio choice and the capital asset pricing model (CAPM), interest rates and the Federal reserve, the relation between consumption, investment and the stock market, and options. The exact topics will be determined during the semester, depending on time and interests, so I reserve the right to change this syllabus as the course proceeds.

The class will emphasize the relation between theory and empirical work. During the lectures, I will first spend some time presenting theories, and then we will look at some facts and how they relate to the theories. Moreover, I will ask you to turn in work where you analyze data in light of these theories (see the section on “Empirical Projects” below). Hence, a good quantitative background is very important for this class (see the prerequisites below).

I hope to spend some time discussing the recent financial crisis - part of this will be just as an illustration as we go along.

By the end of the class, I expect that you:

- will understand some theories used by economists to discuss uncertainty and finance;
- will know some institutional and empirical facts about financial markets;
- will have acquired an ability to analyze data independently, and to formulate and test hypothesis.

Prerequisites

The following are very important prerequisites:

- EC 305 or equivalent (Statistics);
- MA 121 or 123 or 127 (Calculus).
- EC 202 (Intermediate Macroeconomics);
- EC 201 (Intermediate Microeconomics);

If you have not taken yet *either* Ec 202 *or* Ec 201, you may take it concurrently as a co-requisite. Calculus and statistics are absolutely necessary prerequisites as they will be used repeatedly in the class.

Textbook

I will provide class notes (or slides) which will be the main material for the course. These notes will be available on Courseinfo (<http://courseinfo.bu.edu/>) as the course progresses. The following textbook will be made available at the BU Barnes and Noble bookstore (seems to be cheaper on Amazon though)

“Investment Science”, David Luenberger, Oxford University Press.

This textbook will not always cover what we do in class. However, it is useful background.

Readings

In addition to the textbook and class notes, we will discuss some additional readings. I will distribute these readings in class or through the web site.

Grading

Note: to help you prepare, I will give post some short problem sets, which will not be graded. This is on top of the empirical projects.

- Four empirical projects (40%, i.e. 10% each),
- Class participation (10%),
- Midterm (20%), in class on March 4th,
- Final (30%).

The final exam’s date has not yet been announced by the College. The final is comprehensive, closed-book, but you may bring a one-page, single-sided “cheat sheet”.

Academic Conduct Statement

It is your responsibility to know and understand the provisions of the CAS Academic Conduct Code. The encouragement to collaborate on homework assignments is not extended to tests. Read the CAS Academic Conduct Code, which you can pick up in room CAS B-3 or download on www.bu.edu/cas/academics/programs/conductcode.html. Misconduct can involve more subtle acts than direct cheating: for instance, submitting the same work for several courses without the consent of instructors. I will report all cases of suspected academic misconduct to the Deans’ Office.

Empirical Projects

An extremely important part of the class lies in the empirical projects that I will ask you to work on. There will be four projects. These projects are briefly described at the end of this syllabus. Two weeks before the project is due, I will provide you with the data and a list of questions, but you will have some freedom in how to proceed. All these problems are doable with a spreadsheet such as Excel©. You are encouraged to work in groups of two or three students. I will help form groups if needed. Please turn in one answer per group. I will not accept late projects, unless a valid (e.g., family or health emergency) and certified excuse is provided.

Teaching Fellow

The TF is XXX. His office: XXX. Phone: XXX. Email: XXX.

His office hours are XXX in room XXX, or by appointment if you cannot make this time.

Course Web Page the material for this class will be posted on Courseinfo.

COURSE OUTLINE

This is previsional and will be adjusted depending on speed of progress and students' interests.

• Part 1: TOOLS AND BACKGROUND

- **Mathematics and Statistics review, Econometrics (2 lectures, Jan 14 and Jan 19).** Probability Theory. Statistics and basics of regression analysis. Readings: class notes.
- **Background: institutional facts about the financial system, and stylized facts on returns (Jan 21).** Readings: class notes.

• Part 2: SINGLE PERIOD UNCERTAINTY

- **No-Arbitrage. (3 lectures, Jan 26, 28, Feb 2)** Modeling uncertainty: states and securities. Principle of No-Arbitrage. Information aggregation and Prediction Markets. Readings: Chapter 9 of the textbook, and class notes.
- **Expected Utility (4 lectures, Feb 4, 9, 11).** Decision-making under risk: expected utility, risk aversion. Insurance. Markets for uncertainty. Risk Sharing. First look at the Consumption CAPM. Readings: Chapter 9 of the textbook, and class notes.
- **Mean-variance analysis (3 lectures, Feb 18, 20, 25).** Mean-variance portfolio choice. Hedging demand. Readings: Chapter 6 of the textbook, and class notes.
- **MIDTERM: THURSDAY, MARCH 4, in class**
- **The Capital Asset Pricing Model (CAPM) (3 lectures, March 2, 16, 18)** Mutual fund theorem. Equilibrium in the capital market and risk premia. Readings: Chapter 7 of the textbook, and class notes.

• Part 3: DYNAMICS: EVALUATING CASH FLOW STREAMS,

- **Deterministic cash flow streams: present values, interest rates, and the term structure (3 lectures, March 23, 25, 30)** Readings: Chapters 2, 3, 4 of the textbook, and class notes.
- **Random cash flow streams: Gordon Growth Model, Efficient market hypothesis, Conditional Expectations, Event Studies. Consumption CAPM. (2 lectures, April 1 and 6).** Readings: class notes.
- **The link between investment and the stock market (1 lecture, April 8).** Readings: class notes.

• Part 3: INTRODUCTION TO OPTIONS

- **Definitions (options, forwards, futures, swaps) and put-call parity. Black-Scholes pricing formula. Introduction to real options.**(4 lectures, April 13, 15, 20, 27) Readings: chapters 10 and 12 of the textbook, and class notes.

- **Last class (April 29): review session (backup)**
- **Final exam: to be scheduled between May 4 and May 8**

- **EMPIRICAL PROJECTS**

Here are the summaries of the four empirical projects that you will need to turn in. The due dates are provisional.

- 1. Prediction Markets** (*Due on 2-9*)

Markets where people can bet on the outcome of some event (e.g. who will be the next President) have become very popular recently, especially on the Internet (e.g. www.tradesports.com). I will give you data from the market for the presidential election. The questions you will address are: how can we use prices to forecast the outcome of the election? Do prices forecast better than other sources of information such as polls? Are the prediction markets efficient? Finally, can we use these price data to measure the effect of the presidential election on the stock market (or more generally on the probability of other events)?

- 2. MBS, CDO and tranching: numerical simulations** (*Due on 2-25*)

Over the course of 2007-2008, the price of some mortgage-backed securities (MBS) fell by a very large amount. This project will ask you to price some (simplified) MBS, and analyze the effect of "tranching" on security prices, to understand what could lead to these price declines.

- 3. Testing the CAPM, and some Anomalies** (*Due on 3-30*)

The CAPM makes sharp predictions regarding the equilibrium average return on a stock, given its riskiness. I will give you data on the return on several stocks and other assets over several periods. The questions to answer are: How do you measure the riskiness of each asset? How do you test the CAPM? Does the CAPM explain the data well? If not, what are its failures?

- 4. Economics News, Asset Prices** (*Due on 4-20*)

Prices reflect expectations of future cash flows. Hence news about future cash flows affect prices instantaneously. This project studies the effect of data releases by Federal agencies such as the Bureau of Labor Statistics (BLS) or the Bureau of Economic Analysis (BEA). I will give you data on asset prices just before and after the news releases. The questions to answer are: How do we define 'news'? What is the effect of good news on the stock market and on interest rates? What is the mechanism through which news affects prices?