

Ec 445: Economics of Risk and Financial Markets

Instructor

François Gourio, Assistant Professor of Economics.

Office: Room 400, 264 Bay State Road.

Email (easiest way to reach me): fgourio@bu.edu.

Web: <http://people.bu.edu/fgourio>

Phone: 617-353-4534.

Office hours: Thursdays 2-3:30, 4:30-5:30, and Wednesdays 2-3, or by appointment.

Course Overview

Lectures Tu-Th 11-12:30, CAS 235.

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. 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. Because this is a new class (which is taught for the first time), I still do not know exactly if we'll cover everything, or less, or more - 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).

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/>). The following textbook will be made available at the BU Barnes and Noble bookstore:

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

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

Last, this a non-required textbook with less techniques and more discussion, which some students may find useful: “Introduction to the Economics of Financial Markets”, James Bradfield, Oxford University Press.

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

- Four empirical projects (40%, i.e. 10% each),
- Class participation (10%),
- Final (50%). The final exam’s date has not yet been announced by the College. The final is comprehensive.

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 emergency or health problem) and certified excuse is provided.

Teaching Fellow

The TF is Kyoungwan Moon. His office: B10. Phone: 3-5685. Email: khmoon@bu.edu. His office hours are Fridays, 9:30-11 in room B17C, 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. Because this is a new class, I cannot plan very well in advance all the dates, esp. when the projects will be due.

- **Mathematical tools: Statistics and Matrix Algebra (~3 lectures, Jan 17,22,24)**

Probability Theory. Statistics and basics of regression analysis. Some matrix algebra notation. (Note: no prior knowledge of matrix algebra is assumed.)

Readings: class notes.

- **Modeling uncertainty. No-Arbitrage. (~3 lectures, Jan 29,31, Feb 5)**

Modeling uncertainty: states, securities, information, trees. Principle of No-Arbitrage. Information aggregation and Prediction Markets.

Readings: Chapter 9 of the textbook, and class notes.

- **Expected Utility (~ 3 lectures, Feb 7, 12, 14)**

Decision-making under risk: expected utility, risk aversion. Insurance. Markets for uncertain. Risk Sharing.

Readings: Chapter 9 of the textbook, and class notes.

- **Present Values, Interest rates, and the Term Structure (~5 lectures, Feb 21, 26, 28, March 4,6)**

Some basics on securities. Definitions of interest rates, present values, internal rate of return. Efficient market hypothesis. Conditional Expectations. Event Studies. Term Structure of Interest Rates. The expectation hypothesis. The Federal Reserve.

Readings: Chapter 2,3,4 of the textbook, and class notes.

- **Mean-variance analysis (~3 lectures, March 18, 20, 25)**

Mean-variance portfolio choice. Hedging demand.

Readings: Chapter 6 of the textbook, and class notes.

- **The Capital Asset Pricing Model (CAPM) (~3 lectures, March 27, April 1,3)**

Mutual fund theorem. Equilibrium in the capital market and risk premia.

Readings: Chapter 7 of the textbook, and class notes.

- **The link between consumption and the stock market (~2 lectures, April 8,10)**

The consumption-based model: CCAPM.

Readings: class notes.

- **The link between investment and the stock market (~2 lectures, April 15, 17)**

The investment-based model: q -theory.

Readings: class notes.

- **Introduction to Options. (~3 lectures, April 22,24,29).**

Definitions (options, forwards, futures, swaps) and put-call parity. Black-Scholes pricing formula. Introduction to real options.

Readings: chapters 10 and 12 of the textbook, and class notes.

- Last class (May 1st): review session or backup.

Note there is no class on February 19, and during spring break (March 8 through 17).

EMPIRICAL PROJECTS

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

1. Prediction Markets (*Due on Feb 14*)

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. Economics News and Asset Prices (*Due on March 6*)

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?

3. The Federal Reserve and its effect on interest rates (*Due on March 25*)

The Federal Reserve sets the stance of monetary policy by choosing the level of a short-term interest rate, known as the Federal Funds rate. This interest rate affects only a small market. A very important question is how the Federal Reserve affects other interest rates, the ones at which firms and households actually borrow. I will give you data on interest rates on government and corporate bonds and on mortgage rates, and the questions to answer will be: What is the relation between these interest rates and the Federal Funds rate? What mechanism can explain these relations?

4. Testing the CAPM, and some Anomalies (*Due on April 15*)

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?