ICEF, Higher School of Economics Moscow
MSc Programme in Financial Economics
Fall 2016 (term 1) / Spring 2017 (term 2)

Course Syllabus for Financial Economics I (Asset Pricing)

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Objectives of the Course

This course gives an introduction to the economics and mathematics of financial markets. Being the first course in finance within the ICEF Master Programme in Financial Economics, it introduces the students to the relevant modeling techniques for asset pricing. This will be useful for later courses in Corporate Finance, Fixed Income, Derivatives and Risk Management.

The course introduces to the two pricing principles: absence of arbitrage and equilibrium based on individual optimality. The first principle is especially useful for pricing derivative instruments (e.g. an option contract) whenever we know (or assume to know) the dynamics of the price of the underlying asset (e.g. a stock). In order to price the whole universe of financial assets, however, we need to investigate how investors choose their consumption and the composition of their investment portfolios (individual optimality) and how the coordination of these investors on the financial markets leads to the formation of prices (equilibrium analysis). Most of the course covers one-period models and dynamic models in discrete time. However, some equilibrium models are presented in continuous time since this makes them more tractable and they have more elegant solutions. Option pricing in continuous time is left for the 2nd year course in Derivatives. Although the focus of the course is on theory, we shall comment on some empirical evidence and on how these theories are used in financial practice.

The course contains one additional module on Real Options taught by Svetlana Boyarchenko. There will be separate course program and reading list for this part.

Prerequisites

Microeconomics I (concepts of utility functions and equilibrium), a good understanding of calculus, algebra, and basic probability theory. Beyond that, the course should be self-contained.

Learning Methods

The following methods and forms of study are used in the course

- Lectures (24 academic hours per term). Your active participation is required – presenting papers that were given for reading, answering questions, and asking questions.
- Seminars (10 academic hours per term). They serve mainly to solve the homework assignments (see next point).
- Written homework assignments, containing paper-and-pencil exercises and applications in Matlab. Doing homework exercises is crucial for understanding and practicing the material and, needless to say, for passing the exam.
- Self-study: read the corresponding sections in the lecture notes, the chapters in the textbooks as indicated in the course outline below and journal papers as announced in class.

Readings

Required:

- Lecture notes to be distributed at mief.hse.ru
- Cvitanić, Jakša and Fernando Zapatero, Introduction to the Economics and Mathematics of Financial Markets, MIT Press 2004 [short **CZ**].
- Pennacchi, George, The Theory of Asset Pricing, Pearson Addison Wesley, 2008 [short **P**].
- Required readings of journal papers will be announced in class and at `mief.hse.ru`.

Recommended:

- MacKenzie, Donald, An Engine, Not a Camera – How financial Models Shape Markets, MIT Press, 2006. This is recommended for your background in the history of financial markets and finance theory and will help you to put the models covered in the course into a broader perspective.

Additional:

- Altug, Sumru and Pamela Labadie, Asset Pricing for Dynamic Economies, Cambridge University Press, 2008.
- Back, Kerry, Asset Pricing and Portfolio Choice Theory, Oxford University Press, 2010.
- Brandimarte, Paolo, Numerical Methods in Finance and Economics, Wiley, 2006.
- Danthine, Jean-Pierre and John B. Donaldson, Intermediate Financial Theory, 3rd ed. 2014.
- LeRoy, Stephen and Jan Werner, Principles of Financial Economics, Cambridge University Press, 2001.
- Lengwiler, Yvan, Microfoundations of Financial Economics, Princeton University Press, 2004.
- Other classical texts such as Huang and Litzenberger (1988), Ingersoll (1987), and Cochrane (2001) can be consulted as well.

Evaluation

Your final grade consists of the following parts:

- Homework assignments count for 10% of the final grade.
- A midterm exam at the end of the first term accounts for 20% of the final grade.
- There will be a separate module taught by Svetlana Boyarchenko that counts for 15% of the final grade.
- A final exam on the material outlined in this syllabus accounts for 55% of the final grade. Questions on the first term account for approximately one third of the final exam grade, questions on the second term for two thirds.

In order to pass the course, you need to achieve the passing grade of 35% both in the final exam and in total (with the weights given above).

Course Outline

This outline lists the topics to be covered in the course with the corresponding chapters in CZ and P.

TERM 1

Basic Concepts in Financial Markets

- The terminology of financial markets; Bond prices and interest rates under certainty. CZ 1,2
- Individual preferences, utility theory, and risk-aversion. CZ 4.1, P 1

Contingent Claims, No-Arbitrage Principle and Derivative Pricing

- Uncertainty, replicating portfolios, Arrow-Debreu securities, absence of arbitrage, market completeness. The Fundamental Theorem of finance. Pricing forwards and futures. Bounds on option prices following from the absence of arbitrage CZ 3.6, 6.1-6.2, P 4.3, 7.1
- Binomial model of Option pricing. CZ 3.1-3.2, 6.3, P 7.2-7.3

Optimal Consumption and Portfolio Choice

- One-period model. Mean-variance analysis CZ 5.1, P 2
- Dynamic models. Introduction to dynamic programming. CZ 4.2-4.3, P 5

TERM 2

Equilibrium Models

- Equilibrium fundamentals: Concept of equilibrium, representative agent, existence and Pareto-optimality. CZ 12
- Consumption CAPM and CAPM. The Lucas model. Asset Pricing Puzzles. CZ 13.1-13.2, P 3.1, 6
- The direct route from mean-variance analysis to CAPM. CZ 13.1-13.2, P 3.1-3.2
- Multi-factor models. CZ 14, P 3.3
- Review of stochastic calculus. CZ 3.3, P 8
- Continuous time consumption CAPM and Intertemporal CAPM. CZ 13.4-13.5, P 12, 13
- Term structure models of interest rates CZ 8.2, 15.1, P 9.2, 13.3, 17.1 (if time permits)