

Financial Market Microstructure

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Abstract

This elective course covers some of the materials on the microstructure theory of financial markets developed over the last three decades. Theoretical Market Microstructure is intended to develop economic models of financial markets within a “microscopic” approach when one explicitly takes into account a particular market design and types of agents involved in a trading process. One application of the Market Microstructure models is analysis of the impact of market organizational structure on various important market characteristics, such as price efficiency, transaction costs, liquidity, etc., and to construct quantitative indicators of market quality.

The main part of the course is based on original academic research papers on Market Microstructure theory. The emphasis is on the finance models that allow for analytic solutions (analytically tractable.)

The course material is intended to be technically self-consistent, which means that we review all necessary background mathematical tools. This course is quantitative and relies on technical skills developed throughout the course.

Prerequisites

The prerequisite for this class are: Graduate standing, and some basic course on Financial Economics, e.g. based on Huang and Litzenberger, *Foundations for Financial Economics* (HL). Although the course materials are self-contained, the students are recommended to carefully read the HL before taking the course.

This course is rather demanding in terms of the analytic skills. Although the course materials are self-contained, you are encouraged to “brush up” your basic knowledge in several areas, including basic analysis, random processes, and linear algebra. Moreover, it is important to have a “hands on” understanding of all required mathematical concepts. This can be achieved by solving specific problems and analyzing the solutions.

Learning Objectives and Outcomes

The goal is to provide students with the tools and basic knowledge required to understand and appreciate original academic papers on market microstructure. The primary goal is to develop the ability of applying quantitative models and making (correct) calculations to analyze specific

problems, rather than on proving general theorems in a rigorous way. In other words, the tilt is towards a "practical theory" course.

The student should be able to apply professional knowledge and skills acquired while studying the course in practical areas, including academic research, work in financial institutions, industry, state governance.

Methods of Instruction

The following methods and forms of instruction are used in the course:

- Lectures.
- Paper presentations: students are expected to present and discuss in class some required original papers specified by the instructor. Active participation is required.
- Self-study: preparing for classes, it is important to read the corresponding required original research papers and chapters in the textbooks as indicated in the course outline below.

Course Material

The lecture notes and required original papers contain all required material. The readings of journal papers will be announced in class.

Required reading

De Jong, F., and B. Rindi, 2010, *The Microstructure of Financial Markets*, Cambridge Univ. Press, Cambridge.

Optional reading

O'Hara, M., 1995, *Market Microstructure Theory*, Oxford, Blackwell.

Lyons, R. 2001, *The Microstructure Approach to Exchange Rates*, Cambridge, Mass: MIT Press.

Harris, L., 2003, *Trading and Exchange*, Oxford Univ. Press.

Special Equipment and Software Support

Laptop, projector, Internet connection
MS Word, MS Excel

Grading System and Knowledge Assessment

- Class participation including the presentation of papers accounts for 20%.
- The midterm exam accounts for 25%.
- The rest of the grade (55%) comes from the final exam.
- The exact material covered in each of the two exams will be announced in class.

Sample materials for knowledge assessment are available in ICEF Information system at <https://icef-info.hse.ru>.

Course Plan

I Introduction

Institutions and market structure.

II Information and prices; Rational Expectations Equilibrium (REE)

II.1 Hellwig (1980) model.

II.2 Grossman-Stieglitz (1980) model.

III Models of strategic trading

III.1 Auction markets.

III.2 Dynamic strategies.

IV Information and markets

V Liquidity and algorithmic trading

V.1 Optimal execution

V.2 Market quality issues

VI Models of the limit order book (LOB)

VI.1 Uninformed liquidity providers

VI.2 Informed liquidity providers

VII Microstructure models: overview.