Market Microstructure
Module 2, 2017-2018

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Course information

Course Website: my.nes.ru

Professor's Office Hours: Tue, 11:00-12:00 in room 2.10 or by appointment

Class Time: 13:45-15:15 and 15:30-17:00 on Tuesday (first class on Tue Oct 31)

Room Number: 1.14

TAs: Igor Desyatov (idesyatov@nes.ru)

TA's seminars 17:15-18:45 in room 1.14, Nov 21 and Dec 12

Course description

Like option pricing and fixed income, market microstructure has rapidly moved from the research domain of finance professors into the real world, where competition among exchanges, development of trading algorithms, and design of robust market systems all require combining the theory of market microstructure with an understanding of institutional detail of how financial markets work in practice. Liquidity, transaction costs, trading strategies, algorithmic trading, high-frequency trading, crashes, market fragmentation, circuit breakers, market design are topics of great interest to finance professors, market participants, policy makers, and sometimes even to the general public.

In the coming decade, market microstructure has potential to become one of the fastest growing fields of financial economics. All ingredients are indeed in place: Numerous topical questions still have no answers, while theorists are well equipped with game theoretic modeling tools for developing theories to answer those questions and empiricists have access to a vast amount of financial data to test those ideas.

The course will focus on U.S. markets and Russian markets. The general principles are applicable to all markets. By taking this course a studentwill have an opportunity to learn (1) how trading takes place in financial markets; (2) how economic theories relate to this trading; (3) how legal, regulatory, and ethical considerations shape the trading process; (4) and how data can be examined to quantify answers to questions about transaction-by-transaction trading.

This course uses a mixture of lectures and class discussion to examine various aspects of market microstructure. The course involves a mixture of finance and economics. The course will touch on numerous public policy issues, many of which are politically controversial and most of which are likely to continue to be important for years to come. A goal of the course is to provide students with a framework within which these public policy issues can be addresses in a useful manner.

Since "microstructure data," the transaction-by-transaction records of trades as they occur, provide valuable opportunities for learning and research, the course will contain several hands-on exercises using microstructure data. Students are encouraged to use the Python software package for data analysis. The homework assignments are designed to mimic the kinds of

assignments an entry-level professional employee might be asked to perform in a research oriented professional setting related to trading securities.

Course requirements, grading, and attendance policies

The course grade will be based on the following: participation in class, regular homework assignments, in-class tests, and a final exam. Homework will be assigned every week.

Class participation: Class attendance and participation are required. Before each class session, students are encouraged to read the assigned material.

In-class Tests: At the beginning of each lecture (except the very first one), there will be short 10-minutes tests with one question about material of the previous lecture. A goal of these in-class tests is to help students not to fall behind on the material and to keep track of attendance.

Homework assignments: Almost each week students have to read required material and submit a short write-up with their answers on the starred questions. To get extra credit students may also answer questions with no stars. Answers should be succinct and self-contained. Long write-ups are not necessarily good write-ups. Good business writing makes points in a manner that respects the reader's time. Typically, the answers to questions will not be heavily mathematical, but mathematical intuition will often be required to address some of the questions. Write-ups should be uploaded onto mynes before the <u>beginning of class, including the very first class</u>. Students should be prepared to discuss and defend the ideas in their write-ups in class. For some questions, there is no "right" or "wrong" answer, in the sense that finance and economics professors themselves are likely to disagree about the answers to the questions. Students may talk to other students about the assigned questions, but each student should prepare a write-up individually, without looking at the write-ups of other students. Each student should list on the write-up the names of the other students with whom the student discussed the write-up.

Projects: There will be three empirical projects. They are presented at the end of this syllabus. The purpose of the empirical analysis assignments is to enable students to learn to use software to answer empirical questions like they arise in a professional business or research environment. The write-ups should contain results and also a code.

Final Exam: A final exam is in-class and closed-book. One double-sided cheat-sheet is allowed.

Grading: Grading will be based on questions write-ups (15%), in-class tests (15%), projects (15%), and a final exam (50%). Missing class is strongly discouraged. Active class participation will be reflected in the final grade as well (about 5%). Case write-ups are graded on a scale with the following interpretation: 10 = *A + +*, 9 = *A+*, 8 = *A*, 7 = *A-*, 6 = *B+*, 5 = *B*, 4 = *B-*, 3 = *C*, 2 = *D*, 1 = *F*, 0 = *missing*. Most grades are in the range 5*;* 6*;* 7*;* 8. Extra credit is added with extra points. For example, a grade of 6.0 + 0.5 = 6.5 indicates a score of 6 for assigned questions plus 0.5 points for extra credit question.

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.