

**Instructor:** Rahul Ravi Ph.D.  
**Class:** Tuesday 1745 – 2015  
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### **Course Objectives:**

Traditional asset pricing theory focuses primarily on macro-level financial market prices in which the Walrasian Auctioneer sets prices by equating demand and supply. In reality, security prices evolve through a large number of small-scale bilateral trades, performed by people that have specific well-regulated and institutionalized roles.

Market microstructure is the study of trading mechanisms used for financial securities. Its focus is on how markets actually work and market participants really behave. The first part of the course will treat the main theoretical models in this research field. The second part will deal with the empirical analysis in market microstructure. The third part will offer an overview on the special issues of particular interest in market microstructure.

The course is very theoretical, and will be taught with research focus.

### **ACADEMIC INTEGRITY:**

The Code of Conduct (Academic) at Concordia University states that the *“integrity of University academic life and of the degrees, diplomas and certificates the University confers is dependent upon the honesty and soundness of the instructor-student learning relationship and, in particular, that of the evaluation process. As such, all students are expected to be honest in all of their academic endeavours and relationships with the University.”* [Graduate Calendar, Code of Conduct (Academic).]

All students enrolled at Concordia are expected to familiarize themselves with the contents of this Code. You are strongly encouraged to visit the following web address:  
<http://johnmolson.concordia.ca/ugrad/codeofconduct.pdf> which provides useful information about proper academic conduct.

### **Texts:**

To the best of my knowledge there is no single text covering the full scope of financial market microstructure. But since this course is meant to have a research focus, this should not concern us too much, since we will read the original research papers of which I will present tuned-down versions in

class. These papers will be listed on the FirstClass system. Please check there frequently for updates of the course progress.

There are three textbooks that contain some of the material taught in class.

- Maureen O’Hara: Financial Market Theory (1995, OUP) She covers many of the theoretical aspects that we will touch.
- Larry Harris: Trading and Exchanges -Market Microstructure for Practitioners (2004, OUP). This book gives an excellent background reading on many institutional issues. It nicely complements O’Hara’s theoretical models.
- Joel Hasbrouck: Empirical Market Microstructure (2007, OUP) This text is brand new and very good, though written for the graduate level.
- Brunnermeier, Markus K. (2001), Asset Pricing Under Asymmetric Information (Oxford, Oxford University Press).
- Biais, Bruno, Thierry Foucault, Pierre Hillion (1997), Microstructure des marchés financiers, Presses Universitaires de France. IN FRENCH.

Moreover, there are two excellent surveys of the literature in the Handbooks of Financial Economics.

- Hans R. Stoll: “Market Microstructure”, Handbook of The Economics of Finance, Volume 1A: Corporate Finance, Chapter 9, pp. 555-600.
- David Easley and Maureen O’Hara: “Microstructure and Asset Pricing”, Handbook of The Economics of Finance, Volume 1B: Financial Markets and Asset Pricing, Chapter 17, pp. 1021-1047.

As the course progresses, I will update the reference list to include some of the original Papers. Please check the FirstClass course page frequently.

## **Reference materials:**

[www.ssrn.com](http://www.ssrn.com) is a useful website containing many working papers – good place to search for recent work that is not yet published.

## **Evaluation:**

This is meant to be a research-oriented course that heavily relies on class discussion. Thus students’ class participation is imperative. The evaluation will consist of class participation, a term paper (broken into three sub-parts, the Research proposal, Literature review and the Empirical research write-up) and a take home final exam.

- Final: 40%
- Classroom participation: 15%
- Research proposal write up: 5%
- Literature review (word limit: 3000): 15%

- Research write-up (word limit: 3000): 25%

### **Project/Term paper**

The project/term Paper is a vital part of this course; their aim is to get you interested in microstructure research as well as to give you some hands-on experiences. For the sake of this course, I have divided the project into three interdependent parts (For those who would like to further pursue the question, the three separate pieces can be integrated to form a good first draft of a research paper).

1. Pose an interesting question (Research proposal) and
2. Summarize briefly what has been done in the academic literature to answer this question (Literature review).
3. Explore the question posed above using established research techniques and present your methodology and the empirical findings in an essay (Research write-up)

As a consequence, you are encouraged to pick the area of the project yourself. I advise you to pick an area that is closely related to the course’s syllabus, but you are free to choose a related field. Some other details for the project:

*Format:*

*Proposal:* Typed, font size 12 or larger, maximum one page (single sided, letter size).

*Literature review:* A typed essay of maximally 3000 words (**including** list of references and appendices). You must submit an electronic version.

*Research write-up:* A typed essay of maximally 3000 words (**excluding** list of references and appendices). You must submit an electronic version.

*Grading:* You will be graded for content and exposition. The write-up should be clear, well written, correct and inspiring. Grades over 90% require original thoughts. Transmitting one’s ideas in a comprehensible manner is a major part of research. Thus well-written write-ups, free of grammar and spelling errors, are the expected.

*Project Title:* You are free to choose a topic within the realm of financial market microstructure, but I need to approve of the title.

*Deadline:* The literature review essay has to be handed in on **MMMY**. The empirical project has to be handed in on **MMMY**. If you miss the deadline, you lose 500 basis points of your essay grade per day. The deadlines will be determined in the first week of class.

- *Group Work:* For the empirical project maximum two people may work together.

### **GRADING CORRESPONDENCE**

Letter Grade	Numerical equivalent
A+	95% and above
A	90% - 94%
A-	85% - 89%
B+	80% - 84%
B	70% - 79%
B-	61% - 69%
C	55% - 60%
F	Less than 55%

# **COURSE OUTLINE**

This outline lists the topics covered during the course, and the required readings are listed in the attached “Required readings” file. The schedule may change depending on class progress; any changes will be announced in class and posted in the first-class folder. You are expected to be prepared prior to class.

1. Introduction to Market Microstructure Analysis
  - What is Market Microstructure
  - Main structures of financial markets
    - Taxonomy of market structures
    - Overview on main market structures
2. Theoretical models
  - Part I: The basic model: Roll (1984)
  - Part II: The inventory models
  - Part III: Asymmetric information models
3. Empirical analysis
  - Part I: Basic issues in time series analysis
  - Part II: Stylized facts
  - Part III: Empirical models
    - The Roll model
    - The Glosten-Harris model
    - The Madhavan-Richardson-Roomans model
    - The Huang-Stoll model
    - The PIN model
    - The Hasbrouck approach (1991)
    - Cointegration
4. Liquidity provision
  - Definition
  - Limit orders
  - Commonality in liquidity
5. Market Microstructure and Asset Pricing
  - Theory

- Empirical analysis
6. Market Microstructure and Risk Metrics
    - Return volatility
    - Realized volatility
    - Range-based volatility measures
  7. Market Microstructure and Information Disclosures
    - Main features
    - Empirical studies
  8. Microstructure of Foreign Exchange Markets
    - Main characteristics
    - Segmentation and time-of-day patterns in FX markets

## REQUIRED READINGS:

- Introduction to Market Microstructure Analysis
  - My slides.
- Theoretical models
  - My slides.
  - Biais, B, L. Glosten, and C. Spatt (2005), Market Microstructure: a Survey of Microfoundations, Empirical Results, and Policy Implications, *Journal of Financial Markets* 8(2), 217-264.
  - Roll R. (1984), A Simple Implicit Measure of Bid Ask Spread in an Efficient Market, *Journal of Finance* 39, 1127-1139.
- Empirical analysis
  - My slides.
  - Glosten L. and L. Harris (1988), Estimating the Components of the Bid-Ask Spread, *Journal of Financial Economics* 21, 123-142.
  - Hamilton, James D., 1994, *Time Series Analysis*, (Princeton: Princeton University Press); pp. 1-71.
  - Hasbrouck, Joel (1991), The Summary Informativeness of Stock Trades: an Econometric Analysis, *Review of Financial Studies* 4, 571-595.
  - Huang and Stoll (1997), The Components of the Bid-Ask Spread: a General Approach, *Review of Financial Studies* 10, 995-1034.
  - Madhavan, Ananth, Matthew P. Richardson, and Mark Roomans (1997), Why Do Security Prices Change? A Transaction-Level Analysis of NYSE, *Review of Financial Studies* 10, 1035-1064.
- Liquidity provision
  - My slides.
  - Chordia, T., R. Roll, and A. Subrahmanyam (2000), Commonality in liquidity, *Journal of Financial Economics* 56, 2-28.
  - Hasbrouck J. and D. Seppi (2001), Common Factors in Prices, Order Flows, and Liquidity, *Journal of Finance* 59, 383-411.
  - Rinaldo (2004), Order Aggressiveness in Limit Order Book Markets, *Journal of Financial Markets* (7).
- Market Microstructure and Asset Pricing
  - My slides.

- Amihud, Y., and H. Mendelson, (1986), Asset Pricing and Bid-Ask Spread, *Journal of Financial Economics* 17, 223-249.
- Market Microstructure and Risk Metrics
  - My slides.
  - Andersen T., T. Bollerslev, F. X. Diebold and H. Ebens (2001), The Distribution of Stock Return Volatility, *Journal of Financial Economics* 61: 43-76.
- Market Microstructure and Information Disclosures
  - My slides
  - Berry, Thomas D., and Keith M. Howe (1994), Public Information Arrival, *Journal of Finance* 49, 1331-1346.
  - Patell, James M., and Mark A. Wolfson (1984), The Intraday Speed of Adjustment of Stock Prices to Earnings and Dividend Announcements, *Journal of Financial Economics* 13, 223-252.
  - Easley, D., and M. O’Hara (1992), “Time and process of security price adjustment”, *Journal of Finance*, 47(2), pp. 577-605.
- Microstructure of Foreign exchange markets
  - My slides.