

# STOR 891 Stochastic Models for Financial Market Dynamics

T/Th 9:30-10:45, Hanes 125

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Have you ever wondered what makes the price of a stock fluctuate? Why does it go up on some days and down on other? Who or what determines the price of a stock? How does the stock market actually work? How are the interest rates set? How are the foreign exchange rates determined? Clearly, if we know the inner workings of these trading markets, we can become better participants in, and better controllers of them. In this course we shall study stochastic models of such market mechanisms, also called the market microstructure. It so happens that one can discern some common microstructures, such as dealership markets, computerized order-driven markets, limit order markets, etc, that apply regardless of what is being traded: stocks, bonds, futures, options, etc. We shall study models based on inventory and queues, symmetric and asymmetric information, and game theory. The material will be drawn from published papers as well from the following three books:

1. Trading and Exchanges, Larry Harris, (technical level: low)
2. Empirical Market Microstructures, Joel Hasbrouck, (technical level: medium)
3. Market Microstructure Theory, Maureen O'Hara, (technical level: high)
4. Market Microstructure: Confronting many viewpoints, edited by Abergel et al. (technical level: high)

The course assumes that the students are familiar with basic probability, statistics, and discrete and continuous time Markov chains. They do not need to know measure-theoretic probability and stochastic differential equations. In terms of coursework, STOR 641 will be suffice, STOR 641/642/743 will be more than enough.