Topics in Financial Economics

Research Proposal for 2014-2015 Academic Year

Project leaders:

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Description

Availability of high-quality, high-frequency data on stock returns, bid-ask spreads, trading volume, etc., enables financial economists to take a detailed look into the working of financial markets and the pricing of various financial instruments. Empirical researchers keep uncovering interesting stock market regularities; theoretical researchers are busy developing models to explain these regularities.

In this research seminar, students will start by read a number of relevant recent research papers (assigned by the project leaders) with the purpose of identifying a topic he or she will work on throughout the year. Given the project leaders' expertise, the chosen the topic is expected to be from one of the following three areas:

1) Information content and factor structure
2) Theoretical asset pricing
3) Market microstructure

We now provide details about each area.

1. Information content and factor structure

The central question in this area is how to model rich and changing information in financial markets both from theoretical and empirical perspective. To make clear what research in this area involves, let us discuss several directions that students can pursue.

a) *Forecasting stock returns.* Out-of-sample return predictability faces two major problems: parameter uncertainty and parameter instability. The former means that the best model specification and its parameters are not known, while the latter means that the best model can change over time. We focus on forecasting strategies that take into account these problems and discuss and their implementation. Examples of studies in this area are Rapach, Strauss, and Zhou (2010) and Rapach and Zhou (2012).

b) *Forecasting inflation using large number of predictors.* Diffusion index forecasting methodology augments traditional forecasting equations by factors extracted from many possible predictors. We seek how to incorporate large available information into forecasting equation in the most equation in the most efficient and parsimonious way. Related studies are Bai and Ng (2011) and Boivin and Ng (2005).

c) *Testing and forecasting using mixed frequencies.* Many financial series are available at different frequencies and aggregation or interpolation is used to transform data to single frequency. For example, if data on stock prices is sampled monthly and data on dividends is sampled quarterly, then price data can be aggregated to quarterly frequency. We study how these transforms affect traditional methods to test asset pricing models and to forecast returns. We seek how to use this particular feature of financial series efficiently. Related paper is Foroni, Ghysels, and Marcellino (2012).

d) *Estimating time-varying alphas and betas in conditional factor models.* Traditional tests of factor models assume that the factor loadings are constant. However in practice, factor loadings may vary. We study how large is this variation, how it affects the traditional tests of factor models and discuss alternative tests which do not rely on this assumption. Related paper is Ang and Kristensen (2012).

e) *Estimating betas when factors have measurement error.* There are several sources of measurement error in financial factors. For example, they may be constructed from inaccurately collected macroeconomic data or they may be imperfect proxy for the true unobserved underlying factor. In

such cases traditional methods produce inconsistent estimates. We study biases induced by measurement error and investigate alternative consistent estimators. Related study is Meng, Hu, and Bai (2011).

f) *Measuring market efficiency*. Common efficiency measures rely on information content and speed of information incorporation. We discuss limitations of common efficiency measures and propose ways to model information structure and to adjust market efficiency tests to this structure. Related paper is Griffin, Kelly, and Nardari (2010).

2. Theoretical asset pricing

A student working in this area can follow one of the two routes. First, she or he can read an empirical asset pricing paper documenting some interesting property of asset prices for which no or few theoretical explanation exist. "Interesting property'' means that standard asset pricing models are not able to explain it. The goal is then to develop an asset pricing model that can explain this pattern. Second, the student can start with a recently proposed theoretical model and identify some ingredient that plays an important role in reality but is missing in the model. The goal is then to incorporate this ingredient in the model and explore how predictions of the extended model differ from those of the baseline model, and whether the extended model can better explain some empirical findings.

Possible research directions are:

a) *Asset pricing with delegated portfolio management.* Traditional asset pricing models assume that all investors trade in financial instruments *directly*, while in reality most people invest *indirectly* by giving their money to professional portfolio managers. Understanding how the presence of portfolio managers affect various quantities of interest (asset prices, liquidity, trading volume) has been a very active research area recently, but many questions are yet to be explored. Examples of works in this area are Cuoco and Kaniel (2011) and Basak and Pavlova (2012).

b) *Ambiguity aversion and asset prices.* A growing literature looks at the situation where investors are ambiguity averse. Briefly, ambiguity aversion means that investors have multiple, rather than single, priors about some pertinent parameter (-s), and they act so as to maximize their well-being in the worst-case scenario. Introducing ambiguity-averse agents into asset pricing models turned out to be a fruitful line of research, generating a large number of new insights and explaining various puzzling observations. A good starting point to familiarize yourself with this area is to go to the website of Larry Epstein (people.bu.edu/lepstein) and check his recent work on asset pricing under ambiguity.

3. Market microstructure

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, crashes, market design are topics of great interest to finance professors, market participants, policy makers, and sometimes even to the general public, as exemplified by the success of the recently published book ``The Flash Boys'' by Michael Lewis on high frequency trading.

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.

Market microstructure invariance is one of the recently proposed frameworks for thinking about financial markets, see Kyle and Obizhaeva (2013). The invariance hypothesis is based on the intuition that trading in securities markets can be modeled as games played at different speeds or over different horizons for different securities. In actively traded securities, trading takes place at fast speeds over short horizons, perhaps only a few minutes. In inactively traded securities, trading takes place slowly

over longer horizons, perhaps a few months. Invariance hypothesis generates precise quantitative predictions of how various market microstructure variables such bid-ask spread, price impact, order sizes, price resiliency, and market efficiency are related to volume and volatility, measured in calendar time. Several empirical studies found strong evidence in favor of invariance hypothesis using the data on portfolio transitions by U.S. institutional investors, the Trades and Quotes (TAQ) data for U.S. equity market, and Thomson/Reutres data on news articles, see Kyle and Obizhaeva (2013), Kyle, Obizhaeva, Tuzun (2012), and Kyle, Obizhaeva, Sinha, Tuzun (2012). However, there are many other applications that can be explored.

Students with interests in empirical and theoretical market microstructure are invited to participate in the project. It takes students directly to the frontier of research in finance and may result in high-quality work publishable in international journals. Research in this area is also a lot of fun. Here are some suggested topics:

a) *Empirical study of invariance relationships in the Russian financial data.* The project presents an excellent opportunity to learn about the market microstructure of the financial market in Russia and develop skills necessary for working with large financial datasets. This project is also of a broader interest, as it will provide the evidence on whether invariance hypotheses hold outside of the U.S. market.

b) *Empirical study of bid-ask spreads of U.S. equities in the context of market microstructure invariance.* Many important papers have studied bid-ask spreads in the past, for example, see Hans Stoll's presidential address at the AFA Meetings in 2002. However, the invariance framework provides a new perspective for analyzing the data. The project presents an excellent opportunity to learning about the market microstructure of the U.S. financial markets and develop skills necessary for working with large financial datasets. The project is expected to provide valuable insights on some long-standing questions in market microstructure such as, for example, transaction costs at NYSE versus NASDAQ and the effects of reduction in tick size. These questions are especially important nowadays. For example, under a big pressure from the U.S. Congress, the U.S. Securities and Exchange Commission has just announced its plans to implement a pilot test program to trade stocks in wider increments, like nickels instead of pennies, to determine whether such a change would make it easier for investors to trade some securities.

c) *Theoretical study of optimal trading frequency.* The question about optimal trading frequency has recently sparked a fierce debate among economists and policy makers. Budish, Cramton, and Shim (2013) recently argued that the continuous limit order books is a flawed market design that leads to arms race among high frequency traders and propose that financial exchanges instead use frequent batch auctions, conducted at frequent but discrete time intervals, e.g., every second. It will be interesting to study this proposal using the smooth trading model of Kyle, Obizhaeva, Wang (2013). Even though the model has been originally developed in the continuous time, it can be spelled out as a multi-period discrete time model. The project provides an excellent opportunity to learn about most recent developments in theoretical market microstructure.

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