

CORPORATE STRATEGY AND MARKET COMPETITION

MFE PROGRAM
OXFORD UNIVERSITY
TRINITY TERM



PROFESSORS: MARZENA J. ROSTEK AND GUESTS
TH 8:45AM-12:15PM, SAID BUSINESS SCHOOL, LECTURE THEATRE 4

COURSE DESCRIPTION:

The aim of this course is to introduce students to the industrial organization of financial markets, and to cover recent topics in this very active research field. These topics concern the effects that investors' price impact has on prices, trading strategies, volume etc. Incorporating traders' impact on asset prices is the main difference between the modern and the standard competitive approach to asset pricing. The latter assumes that each trader is negligible and his orders have no influence on the market price (and, hence, the return).

Why to consider price impact in asset pricing? Extensive empirical evidence has shown that large institutional traders (e.g., hedge funds, mutual funds, investment banks etc.) do have price impact and take it into account when trading. Here are some facts:

■ Institutional investors do not place their orders at once, but rather split these orders into smaller blocks and place them sequentially, or simultaneously in different markets. The execution of trade through the breaking up of orders is meant to mitigate the adverse effects of price impact. For example, at the NYSE, only 20% of the total trading value of all institutional purchases and sales is completed within one day, while more than 50% takes at least 4 days for execution. If traded at once, a typical institutional package would represent more than 60% of the daily trading volume of the entire exchange.

	1 Day	2-3 Days	4-6 Days	>6 Days
Buy	20.1%	26.7%	21.7%	31.5%
Sell	22.1%	27.2%	20.5%	30.2%

Notes: Chan and Lakonishok, 1995; All trades of NYSE and AMEX stocks by 37 investment management firms from July 1, 1986, to December 30, 1988 (October 1987 excluded). The numbers represent the total volume of trade measured in \$.

■ The trading costs associated with price impact (a.k.a. "implicit trading cost") actually dominate the explicit costs of trade – commission fees, order processing fees, brokerage fees, etc.

■ To deal with these costs, the trading desks have begun using the so-called Market Impact Models. These are pieces of software used to estimate price impact and to help develop strategies to lessen its adverse effects (e.g., Citigroup, EQ International, ITG, MCI Barra, OptiMark).



Who should take this class? Anyone who wants to have a big picture about the modern approaches to asset pricing, who would like to learn recently established empirical facts about the financial market microstructure, and who wants to gain a sophisticated understanding of strategic interactions in financial markets.

Here is one reason why to take this course at Oxford: It turns out that many key contributors to the theory and empirics of the industrial organization of financial markets have been (or are!) associated with Oxford.

We will use tools of microeconomics, finance, and game theory.

COURSE STRUCTURE:

1. MODELLING THIN FINANCIAL MARKETS (Dr Marzena J. Rostek)

We will examine the evidence on price impact in financial markets; will study the key modelling approaches that have been used to incorporate traders' market power; and the most common price impact functions used by financial practitioners; will learn whether price impact strengthens or weakens limits to arbitrage and the possibility of price manipulation; and how price impact affects asset valuation.

2. LIQUIDITY AND ASSET PRICING (Dr Marzena J. Rostek)

There are many definitions of liquidity, but broadly it is defined "the ease of trading a security." The existence of significant liquidity premia in asset returns has been well documented: Two securities might have identical cash flows, but hard to trade securities will have lower prices compared to their more liquid counterparts. Early studies considered liquidity as a market friction/anomaly, but liquidity is increasingly viewed as an inherent characteristic of an asset that should be priced just like risk and return. We will learn how to (define and) measure liquidity; will study empirical evidence established about the relation between liquidity and the volume, return, and volatility; will examine the leading models of liquidity that are currently being used.

3. PRIVATE INFORMATION IN THIN FINANCIAL MARKETS (Dr Marzena J. Rostek)

Any reasonable model of a financial market should acknowledge that traders have private information – about returns, their holdings, or preferences etc. Under what conditions do market prices and trades aggregate the dispersed private information of investors? For example, could an outside observer infer the average value of holdings after observing the market price? How does market structure affect whether or not private information ends up being aggregated into the market price? How does the presence of private information affect individual bidder behaviour? We will study these questions after we learn some powerful projection theorems.

4. DESIGN OF THIN FINANCIAL MARKETS. TREASURY AUCTIONS (Dr Marzena J. Rostek)

Almost every Treasury all over the world auctions securities on a weekly basis. Treasury Auctions are a primary open market operation. Market for Treasury securities typically attract large bidders, whose orders influence the auction price. We will use the example of the market for securities to study financial market design: auction formats typically used in

practice, the ranking of these formats in terms of revenue and efficiency, the adjustment of bidder behaviour to different auction formats, challenges that have arisen in *practical* design of Treasury auctions.



5. ADVERTISING (Dr David Myatt)

Advertising, marketing and product design allow for creation of new assets. How are profits influenced by advertising, marketing, and product design? We will learn how to enrich an otherwise standard mode of competition among traders to formally address these questions.

6. MARKET STRUCTURE (Dr David Myatt)

What determines market structure, industry conduct, and economic performance? How to measure conduct and performance of financial industries? Can we (and if so, when do we) observe *excess* entry into markets? While fixed costs determine industry structure and performance, can the resulting performance also influence endogenously chosen fixed costs?

7. SEQUENTIAL MERGER REVIEW (Dr Volker Nocke)

We will study how the dynamics of market structure affects the investors' relative outcomes. Are mergers always profit-increasing? What is the optimal dynamic policy of an antitrust authority towards horizontal mergers?

8. FINANCIAL MARKET MICROSTRUCTURE (Dr Marek Weretka)

How is insider information revealed through trading? How do price formation and price discovery depend on the frequency of trade? What is the value of private information to an insider? What determines the liquidity of a speculative market?

EVALUATION:

There will be an unseen written exam. The exam will consist of:

- Multiple-choice questions (50%)
- Longer questions (you will have a choice of 2 out of 5+) (50%)

At the end of every meeting, we will play around the material. This way, we will practice the kinds of questions you will see on the final.

Alternatively, instead of answering the longer questions on the final, you could choose to prepare a 10-15 minute presentation. The presentation would concern an aspect of the industrial organization of financial markets (found by you). Possible topics include: financial networks; evidence on traders' price impact and discussion of its practical implications; information propagation in markets etc. Thus, the total credit would be split half-half between answering multiple-choice questions, and the short presentation. The presentation would take place in week 4. The deadline for choosing this option is the end of week 1 (Sunday, at midnight).

READING LIST:

(Might be subject to slight changes.)

The list below consists of “Main readings” as well as “Additional readings.” The former are the readings that will be covered in class in more detail. The latter are meant as suggestions for background reading or extensions that will be mentioned in the lectures.

1. MODELLING THIN FINANCIAL MARKETS

Main readings:

- Amihud, Y., H. Mendelson, and L. H. Pedersen (2005): “Liquidity and Asset Prices,” *Foundations and Trends in Finance* 1: 269–364.
- Chan, L., and Lakonishok (1995): “The Behavior of Stock Price Around Institutional Trades,” *Journal of Finance*, 50: 1147-1174.
- Huberman, G., and W. Stanzl (2004): “Price Manipulation and Quasi-Arbitrage,” *Econometrica*, 74, 4: 1247-1276.
- Klemperer, P., and M. Meyer (1989): “Supply Function Equilibria in Oligopoly under Uncertainty,” *Econometrica*, 57: 1243-1277.
- Kyle, A. S. (1989): “Informed Speculation and Imperfect Competition,” *Review of Economic Studies*, 56: 517-556.
- Vayanos, D. (1999): “Strategic Trading and Welfare in a Dynamic Market,” *Review of Economic Studies*, 66, 2: 219-254.

Additional readings:

- Almgren, R. (2003): “Optimal Execution with Non-linear Impact Functions and Trading Enhanced Risk,” *Applied Mathematical Finance*, 10: 1-18.
- Almgren, R., and N. Chriss (2000): “Optimal Execution of Portfolio Transactions,” *Journal of Risk*, 3: 5-39.
- Almgren, R., C. Thum, E. Hauptmann, and H. Li (2005): “Equity Market Impact,” *Risk*: 57-62.
- Chan, L., and J. Lakonishok (1993): “Institutional Traders and Intraday Stock Price Behavior,” *Journal of Financial Economics*, 33: 173-199.
- Estabrook, J. (2001): “Blockage Discounts: What are they and How do they Affect the Fair Market Value of Publicly Traded Stocks, Real Estate, and Other Assets,” American Society of Appraisers International Appraisal Conference.
- Grossman, S. J. (1981): “Nash Equilibrium and the Industrial Organization of Markets with Large Fixed Costs,” *Econometrica*, 49, 5: 1149-72.
- Keim, D., and A. Madhavan (1995): “The Anatomy of the Trading Process: Empirical Evidence on the Behavior of Institutional Traders,” *Journal of Financial Economics*, 37: 371-398.
- Mitchell, M., L. H. Pedersen, and T. Pulvino (2007): “Slow Moving Capital,” *American Economic Review, P&P*, 97, 2: 215-220.
- Shleifer, A. (1986): “Do Demand Curves for Stocks Slope Down,” *Journal of Finance* 41: 579–90.

2. LIQUIDITY AND ASSET PRICING

Main readings:

- Brunnermeier, M., and L. H. Pedersen (2006): "Market Liquidity and Funding Liquidity," Working paper, Princeton University.
- Duffie, D., N. Garleanu, and L.H. Pedersen (2005): "Over-the-Counter Markets," *Econometrica* 73:1815–47.
- Selected papers by Dimitri Vayanos, Pierre-Olivier Weill.

Additional readings:

- Chordia, T., Roll R., and A. Subrahmanyam (2002): "Commonality in Liquidity," *Journal of Financial Economics*, 56: 3-28.
- Newman, Y. and M. Rierson (2004): "Illiquidity Spillovers: Theory and Evidence from European Telecom Bond Issuance," Working paper.

Surveys:

- Amihud, Y., H. Mendelson, and L. H. Pedersen (2005): "Liquidity and Asset Prices," *Foundations and Trends in Finance*, 1:269–364.
- Biais, B. R., 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.
- Madhavan, A. (2000): "Market Microstructure," *Journal of Financial Markets*, 3: 205-258.

3. PRIVATE INFORMATION IN THIN FINANCIAL MARKETS

Main readings:

- Vives, X. (2008): *Information and Learning in Markets*, Princeton University Press, forthcoming.

Draft available at: <http://webprofesores.iese.edu/xvives/books.asp>

Additional readings:

- Foster, F. D. and S. Viswanathan (1996): "Strategic Trading When Agents Forecast the Forecasts of Others," *Journal of Finance*, 51, 4: 1437-1478.
- Medrano, L. A. and X. Vives (2001): "Strategic Behavior and Price Discovery," *RAND Journal of Economics*, 32, 2: 221-248.

4. DESIGN OF THIN FINANCIAL MARKETS. TREASURY AUCTIONS

Main readings:

- Klemperer, P. (2002): "What Really Matters in Auction Design," *Journal of Economic Perspectives*, 16, 1: 169-189.

Available at <http://www.paulklemperer.org/>

- U.S. Department of the Treasury (1998): "Uniform-Price Auctions: Update of the Treasury Experience," Office of Market Finance, Washington D.C.

<http://www.treas.gov/offices/domestic-finance/debt-management>

Additional readings:

- Ausubel, L. M., and P. Cramton (2004): "Auctioning Many Divisible Goods," *Journal of the European Economic Association*, 2, 2-3: 480-493.
- Back, K. and J. F. Zender (1993): "Auctions of Divisible Goods: On The Rationale for the Treasury Experiment," *Review of Financial Studies*, 6: 733-664.
- Bindseil, U., K. G. Nyborg and I. Strebulaev (2006): "Bidding and Performance in Repo Auctions: Evidence from ECB Open Market Operations," ECB and CEPR Working paper.
- Brenner, M., D. Galai and O. Sade (2006): "Auctioning Financial Assets; Discriminatory vs. Uniform, Which Method is Preferred?," Working paper.
- Kremer, I., and N. Nyborg (2004b): "Underpricing and Market Power in Uniform Price Auctions," *Review of Financial Studies*, 17, 3: 849-877.
- LiCalzi, M., and A. Pavan (2005): "Tilting the Supply Schedule to Enhance Competition in Uniform-Price Auctions," *European Economic Review*, 49: 227-50.
- Wang J. J. D. and J. F. Zander (2002): "Auctioning Divisible Goods," *Economic Theory*, 19: 673-705.
- Wilson, R. (1979): "Auctions of Shares," *Quarterly Journal of Economics*, 94: 675-689.

5. ADVERTISING

Main readings: Lecture notes.

6. MARKET STRUCTURE

Main readings: Lecture notes.

7. SEQUENTIAL MERGER REVIEW

Main readings: Lecture notes.

8. FINANCIAL MARKET MICROSTRUCTURE

Main readings:

- Back, K. (1992): "Insider Trading in Continuous Time," *Review of Financial Studies*, 5, 3: 387-409.
- Easley, D., and M. O'Hara (1987): "Price, Trade Size, and Information in Securities Markets," *Journal of Financial Economics*, 19: 69-90.
- Glosten, L., and P. Milgrom (1985): "Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders," *Journal of Financial Economics*, 13: 71-100.
- Kyle, A. S. (1985): "Continuous Auctions and Insider Trading," *Econometrica*, 53: 1315-1336.

Additional readings:

- Foster, F. D. and S. Viswanathan (1996): "Strategic Trading When Agents Forecast the Forecasts of Others," *Journal of Finance*, 51, 4: 1437-78.
- Holden, C. W., and A. Subrahmanyam (1996): "Risk Aversion, Liquidity, and Endogenous Short Horizons," *Review of Financial Studies*, 9, 2: 691-722.