BUS 35909
Topics in Asset Pricing
Spring 2006

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TOPICS IN ASSET PRICING

Administrative Notes

Course Web Page: I have set up the course Web page on the University's Chalk system

`http://chalk.uchicago.edu`

To access the web page, you need the Universitys CNetID and password. In case you dont have these yet, you can claim them at http://cnet.uchicago.edu. If you are not registered officially for class, but you want access on Chalk, send me an email.

Office Hours: Open door policy with the following caveats:

- I will post answers to frequently asked questions on the class webpage on Chalk. Please, check up the announcements on Chalk before asking me questions, since the answer could already be there.
- Try to ask your questions by email first. In many cases, the answer can easily be given by email, and you can expect it within a reasonable time. I will also post the question and the answer on Chalk as an announcement. (Of course, I will not disclose who asked the question.)
- If you expect you need a long meeting, please try to arrange a mutually convenient meeting time with me first.

Teaching Assistant: Marcus Opp, mopp@ChicagoGSB.edu.

Administrative Assistant: Allison Harris, Room: HPC 343; Phone: (773) 834-2079; Email: aharris@ChicagoGSB.edu.

Lectures: Mondays 4–7pm, HPC-08. For each lecture (with the exception of the first one which will be of a more introductory nature), I will assign 3–4 papers to be discussed in class. Before class the students will submit a one-page write-up about these papers, as part of the Problem Sets (see below). The papers selected for each class will be the ones I consider the most important ones on a certain topic. The focus will be on theoretical papers, nevertheless empirical papers will be discussed as well.

Problem Sets: There will be a problem set each week, to be posted after lecture. Each problem set will be composed of three parts:

1. *Required:* A few conceptual questions related to the material taught during that week.
2. *Optional:* Quantitative questions related to the material taught during that week. This is for the students who want to learn the material in more depth.
3. *Required:* A one-page write-up about the papers to be read for the next class. I will provide questions to help students organize the write-up. The length should be of at least half a page, but no more than one page. It should *not* be quantitative, but rather a subjective first reaction to the papers.

Final Project/Exam: There are three ways of fulfilling this requirement:

1. A research paper to be written on a topic related to the class material. The topic can be chosen by the student, but I have to agree with it. The paper should typically include: (a) Introduction with motivation; (b) the development of a model; (c) its solution and prediction; (d) calibration or test of the model's implications. This option is designed to help the second-year students with their Curriculum Paper.
2. A project to be written after the student reads one major paper, and at least two minor papers in a related area. (By "major" paper I only mean that the project will focus on this particular paper.) The project should be similar to a referee report, except that it should focus on a question that the major and minor papers are trying to answer. Again, the topic/papers must be discussed with me. For example, as major paper you might choose Pastor and Stambaugh (2003), and as your minor papers you might choose Acharya and Pedersen (2005), and Chordia, Roll and Subrahmanyam (2000).
3. A final exam to be taken at home, with both qualitative and quantitative questions related to the course.

Grading: Class participation, problems sets, and final project/exam will count 10%, 20%, and 70% respectively.

Recommended Textbooks

1. Markus Brunnermeier, *Asset Pricing under Asymmetric Information: Bubbles, Crashes, Technical Analysis, and Herding*, Oxford University Press, 2001.
2. Maureen O'Hara, *Market Microstructure Theory*, Blackwell, 1995.
3. Andrei Shleifer, *Inefficient Markets: An Introduction to Behavioral Finance*, Oxford University Press, 2000.

Prerequisites

Business 35904 (Asset Pricing). Good knowledge of Microeconomics (including Game Theory) at the PhD level is essential.

Course Description

The course provides an overview of three related areas: market microstructure, market efficiency, and asset pricing with frictions. Although the main focus of the course is theoretic, I will try to provide a balance between theoretical and empirical work, and bring the motivated student to the frontier of research in these areas.

Traditionally, asset pricing focuses on the connection between prices and fundamentals (cash flows) via the stochastic discount factor. Information and market structure or the process of trading are barely mentioned in classical asset pricing. By contrast, this course will focus on the effect of information and the trading process on prices.

Recent work in market microstructure shows that a key property of order flow, *liquidity* (together with the related measures of trading volume, bid-ask spread, price impact of transactions, and volatility) has an important effect on prices. This puts under doubt the classical paradigm of the stochastic discount factor, and the arguments on both sides of the debate will be analyzed. Also, the recent literature on *time-varying* liquidity shows that this seems to have a strong impact on asset prices, so some papers from this literature will be discussed in detail.

Of special interest in this course will be to provide a rigorous understanding of the elusive concept of liquidity. To define it, various models of price formation will be discussed, in particular the inventory models and the asymmetric information models. On the empirical side, several intriguing regularities will be analyzed, such as the downward sloping demand for stocks, the illiquidity premium, the closed-end fund puzzle, the excess volatility puzzle, and so on. The process of trading will also be discussed in more detail, with an analysis of the reasons to trade, reactions to news, insider trading, market manipulation, and front running.

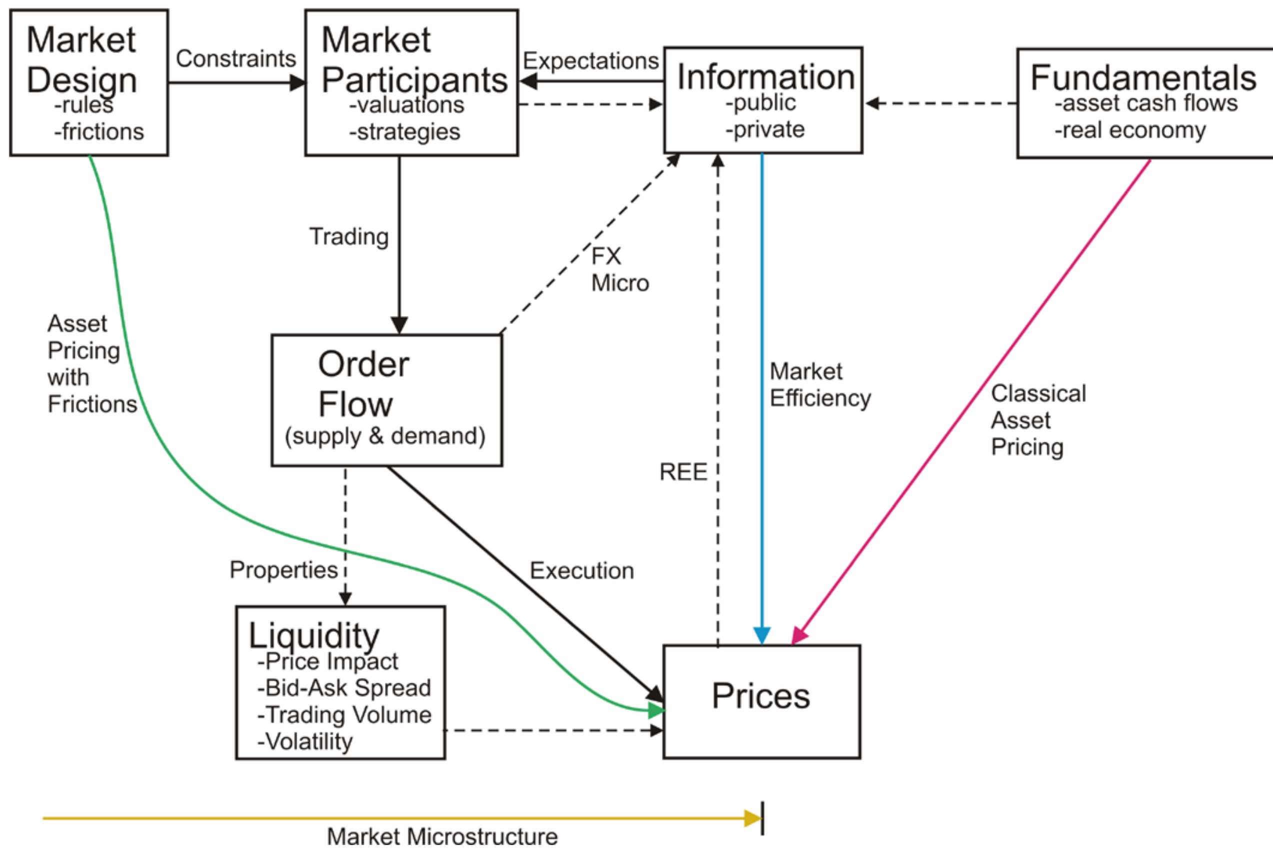
Besides looking at the order flow and liquidity, one can analyze the information set and various contraints on the market participants (transaction costs, short-sale contraints, etc). This leads to the topics of market efficiency and asset pricing with frictions. The course will look at differences of opinion and asymmetric information, learning and uncertainty, bubbles and limits to arbitrage.

Some issued related to market design will be covered, and several types of markets will be discussed: specialist markets, dealer markets, call auctions, over-the-counter markets, order-driven markets, and ECNs.

Of course, because of time constraints not all topics will be covered in depth. Some of them will be discussed in much more detail, while others will be touched only briefly.

To understand better the distinctions between the three areas of research, I present below a diagram with the connection between the central concepts. The differences are blurred, but here are a few general rules how to separate them:

- Market microstructure: focuses on price formation, order flow and trading. In the most general sense, it should include the other two areas.
- Market (in)efficiency: focuses on information and constraints.
- Asset pricing with frictions: focuses mostly on the various constraints on the market participants (e.g. transactions costs).



Course Outline and Readings

This is an extensive list of references on some selected topics that might be discussed in class. The actual reading list will be given each week after lecture, since it depends on how the class progresses.

Transactions Costs, Liquidity Risk, Asset Returns

- Acharya and Pedersen (2005), Asset Pricing with Liquidity Risk, *Journal of Financial Economics* **77**, 375-410.
- Amihud (2002), Illiquidity and Stock Returns, Journal of Financial Markets 5, 31-56.
- Amihud and Mendelson (1986), Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* **17**, 223-249.
- Chordia, Roll and Subrahmanyam (2000), Commonality in Liquidity, *Journal of Financial Economics* **56**, 3-28.
- Constantinides (1986), Capital Market Equilibrium with Transaction Costs, *Journal of Political Economy* **94**, 842-862.

- Hasbrouck and Seppi (2001), Common Factors in Prices, Order Flows and Liquidity, *Journal of Financial Economics* **59**, 383-411.
- He and Modest (1995), Market Frictions and Consumption-Based Asst Pricing, *Journal of Political Economy* **103**, 94-117.
- Heaton and Lucas (1996), Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing, *Journal of Political Economy* **104**, 443-487.
- Pastor and Stambaugh (2003), Liquidity risk and expected stock returns, *Journal of Political Economy* **111**, 642-685.
- Vayanos (1998), Transaction Costs and Asset Prices: A Dynamic Equilibrium Model, *Review of Financial Studies* **11**, 1-58.
- Vayanos and Vila (1999), Equilibrium Interest Rate and Liquidity Premium With Transaction Costs, Economic Theory 13, 509-539.
- Brennan, M., and A. Subrahmanyam (1998), Market Microstructure and Asset Pricing: On the Compensation for Illiquidity in Stock Returns, *Journal of Financial Economics* **41**, 441-464.
- Chordia, T., R. Roll, and A. Subrahmanyam (2001), Market Liquidity and Trading Activity, *Journal of Finance*.
- Chordia, T., R. Roll, and A. Subrahmanyam (2002), Order Imbalance, Liquidity and Market Returns, *Journal of Financial Economics* **65**, 111-130.
- Easley, D., S. Hvidkjaer, and M. OHara (2002), Is Information Risk a Determinant of Asset Returns? *Journal of Finance* **57**, 2185-2221.
- Easley, D., N. Kiefer, and M. OHara (1997), One Day in the Life of a Very Common Stock, *Review of Financial Studies* **10**, 805-835.
- Easley, D., N. Kiefer, M. OHara, Paperman (1996), Liquidity, Information and Less Frequently Traded Stocks, *Journal of Finance* **51**, 1405-1436.
- Engle, R. and J. Russell (2003), Autoregressive Conditional Duration: A New Model for Irregularly Spaced Data, *Econometrica* **66**, 1127-1162.
- Korajcyk, R., and R. Sadka (2004), Are Momentum Profits Robust to Trading Costs?, *Journal of Finance* **59**, 1039-1082.

Market Making and Inventory Control

Theory Papers

- Amihud, Y., and H. Mendelson (1980), Dealership Markets: Market Making with Inventory, *Journal of Financial Economics* **8**, 31-53.
- Biais, B. (1993), Price Formation and Equilibrium Liquidity in Fragmented and Centralized Markets, *Journal of Finance* **48**, 157-185.
- Garman, M. (1976), Market Microstructure, *Journal of Financial Economics* **3**, 257-275.
- Ho, T., and H. Stoll (1981), Optimal Dealer Pricing Under Transactions and Return Uncertainty, *Journal of Financial Economics* **9**, 47-73.

- Ho, T., and H. Stoll (1983), The Dynamics of Dealer Markets Under Competition, *Journal of Finance* **38**, 1053-1074.
- O'Hara, M., and G. Oldfield (1986), The Microeconomics of Market Making, *Journal of Financial and Quantitative Analysis* **21**, 361-376.
- Stoll, H. (1976), Dealer Inventory Behavior: An Empirical Investigation of Nasdaq Stocks, *Journal of Financial and Quantitative Analysis* **11**, 359-380.

Empirical Papers:

- Bacidore, J. and G. Sofianos (2002), Liquidity Provision and Specialist Trading in NYSE-Listed Non-U.S. Stocks, *Journal of Financial Economics* **63**, 133-158.
- Chakravarty, S., and L. Kai (2003), An Examination of Own Account Trading by Dual Traders in Futures Markets, *Journal of Financial Economics* **69**, 375-397.
- Hansch, O., Naik, N. and S. Viswanathan (1998), Do Inventories Matter in Dealership Markets? Evidence from the London Stock Exchange, *Journal of Finance* **53**, 1623-1656.
- Hasbrouck, J., and G. Sofianos (1993), The Trades of Market Makers: An Empirical Analysis of NYSE Specialists, *Journal of Finance* **48**, 1565-1593.
- Kavajecz, K., and E. Odders-White (2001), An Examination of Changes in Specialists Posted Price Schedules, *Review of Financial Studies* **14**, 681-704.
- Lyons, R. (1993), Tests of Microstructure Hypotheses in the Foreign Exchange Market, *Journal of Financial Economics* **39**, 321-351.
- Madhavan, A., and S. Smidt (1993), An Intraday Analysis of Daily Changes in Specialists Inventories and Quotations, *Journal of Finance* **48**, 1595-1628.
- Manaster, S., and S. Mann (1996), Life in the Pits: Competitive Market Making and Inventory Control, *Review of Financial Studies* **6**, 953-975.
- Naik, N., and P. Yadav (2003), Do Dealer Firms Manage Inventory on a Stockbystock or a Portfolio Basis? *Journal of Financial Economics* **69**, 325-353.
- Reiss, P. and I. Werner (1998), Does Risk Sharing Motivate Interdealer trading? *Journal of Finance* **53**, 1657-1703.

Asymmetric Information and Strategic Trading

Theory Papers:

- Admati, A., and P. Pfleiderer (1988), A Theory of Intraday Patterns: Volume and Price Variability, *Review of Financial Studies* **1**, 3-40.
- Brock, W., and A. Kleidon (1992), Periodic Market Closure and Trading Volume: A Model of Intraday Bids and Asks, *Journal of Economic Dynamics and Control* **16**, 451-489.
- Bagehot, W. (1971), The Only Game in Town, *Financial Analysts Journal* **27**, 12-14.
- Campbell and Kyle (1993), Smart Money, Noise Trading and Stock Price Behavior, *Review of Economic Studies* **60**, 1-34.

- Copeland, T., and D. Galai (1983), Information Effects and the Bid-Ask Spread, *Journal of Finance* **38**, 1457-1469.
- Easley, D., and M. OHara (1987), Price, Trade Size, and Information in Securities Markets, *Journal of Financial Economics* **19**, 69-90.
- Foster, D., and S. Viswanathan (1990), A Theory of the Intraday Variations in Volume, Variance, and Trading Costs in Securities Markets, *Review of Financial Studies* **3**, 593-624.
- Glosten, L., and P. Milgrom (1985), Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders, *Journal of Financial Economics* **14**, 71-100.
- Grossman and Stiglitz (1980), On the Impossibility of Informationally Efficient Markets, *American Economic Review* **70**, 393-408.
- Kyle, A. (1985), Continuous Auctions and Insider Trading, *Econometrica* **53**, 1315-1335.
- Kyle, A.S. (1989) Informed Speculation with Imperfect Competition, *Review of Economic Studies* **56**, 317-356.
- Llorente, Michaely, Saar, and Wang (2002), Dynamic Volume-Return Relation of Individual Stocks, *Review of Financial Studies* **15**, 1005-1047.
- Speigel, M., and A. Subrahmanyam (1995), On Intraday Risk Premia, *Journal of Finance* **50**, 319-339.
- Vayanos (2001), Strategic Trading in a Dynamic Noisy Market, *Journal of Finance* **56**, 131-171.
- Wang (1993), A Model of Intertemporal Asset Prices Under Asymmetric Information, *Review of Economic Studies* **60**, 249-282.

Empirical Papers:

a. Transactions costs

- Bessembinder, H. (2003), Issues in Assessing Trade Execution Costs, *Journal of Financial Markets.*
- Huang, R., and H. Stoll (1996), Dealer versus Auction Markets: A Paired Comparison of Execution Costs on NASDAQ and the NYSE, *Journal of Financial Economics* **41**, 313-357.
- Madhavan, A., and S. Smidt (1991), A Bayesian Model of Intraday Specialist Pricing, *Journal of Financial Economics* **31**, 99-134.
- Madhavan, A., Richardson, M., and M. Roomans (1997), Why Do Security Prices Change? A Transaction-Level Analysis of NYSE Stocks, *Review of Financial Studies* **6**, 345-374.
- Werner, I. (2003), NYSE Spreads, Order Flow, and Information, *Journal of Financial Markets* **6**, 309-335.

b. Decomposing the spread

- George, T., G. Kaul, and Nimalendran (1991), Estimation of the Bid-Ask Spread and its Components: A New Approach, *Review of Financial Studies* **4**, 623-656.
- Glosten, L., and L. Harris (1988), Estimating the Components of the Bid-Ask Spread, *Journal of Financial Economics* **21**, 123-142.
- Huang, R., and H. Stoll (1997), The Components of the Bid-Ask Spread: A General Approach, *Review of Financial Studies* **10**, 995-1034.
- Petersen, M., and D. Fialkowski (1994), Posted versus Effective Spreads, *Journal of Financial Economics* **35**, 269-292.
- Roll, R. (1984), A Simple Implicit Measure of the Effective Bid-Ask Spread in an Efficient Market, *Journal of Finance* **39**, 1127-1139.
- Stoll, H. (1989), Inferring the Components of the Bid-Ask Spread: Theory and Empirical Tests, *Journal of Finance* **44**, 115-134.

c. Intraday patterns

- Chan, K.C., W. Christie, and P. Schultz (1995), Market Structure and the Intraday Patterns of Bid-Ask Spreads for Nasdaq Securities, *Journal of Business* **68**, 35-60.

- Foster, D., and S. Viswanathan (1993), Variations in Trading Volume, Variance, and Trading Costs: Evidence on Recent Price Formation Models, *Journal of Finance* **48**, 187-211.
- Jain, P. and G. Joh (1988), The Dependence Between Hourly Prices and Trading Volume, *Journal of Financial and Quantitative Analysis* **23**, 269-284.
- McInish, T., and R. Wood (1992), An Analysis of Intraday Patterns in Bid/Ask Spreads for NYSE Stocks, *Journal of Finance* **47**, 753-764.

d. Price Process

- Chakravarty, S. (2001), Stealth Trading: Which Traders Trades Move Prices?, *Journal of Financial Economics* **61**, 289-307.
- Hasbrouck, J. (1991), Measuring the Information Content of Stock Trades, *Journal of Finance* **46**, 179-207.
- Hasbrouck, J. (1991), The Summary Informativeness of Stock Trades: An Econometric Analysis, *Review of Financial Studies* **4**, 571-595.
- Hasbrouck, J. (1993), Assessing the Quality of a Security Market: A New Approach to Transaction-Cost Measurement, *Review of Financial Studies* **6**, 191-212.

Rational expectations

- Blume and D. Easley (1990), Implementation of Walrasian Expectations Equilibria, *Journal of Economic Theory* **51**, 207-227.
- Grossman, S. (1981), An Introduction to the Theory of Rational Expectations under Asymmetric Information, *Review of Economic Studies* **4**, 541-559.

- Guesnerie, R. (1992), An Exploration of the Educative Justifications of the Rational-Expectations Hypothesis, *American Economic Review* **82**, 5, 1254-1278.
- Laffont, J-J.(1985), On the Welfare Analysis of Rational Expectations Equilibria with Asymmetric Information, *Econometrica* **53**, 1-29.
- Milgrom, P. (1981) Rational Expectations, Information Acquisition, and Competitive Bidding, *Econometrica* **49**, 921-943.
- Admati, A. (1985), A Noisy Rational Expectations Equilibrium for Multi-Asset Securities Markets, *Econometrica* **53**, 629-657.
- Diamond and Verrecchia (1981), Information Aggregation in a Noisy Rational Expectations Economy, *Journal of Financial Economics* **9**, 221-235.
- Diamond and Verrecchia (1991), Disclosure, Liquidity, and the Cost of Capital, *Journal of Finance* **46**, 1325-1359.
- Grossman, S. and J. Stiglitz (1980), On the Impossibility of Informationally Efficient Markets, *American Economic Review* **3**, 393-408.
- Grundy, B. and M. McNichols, (1989), Trade and Revelation of Information through Prices and Direct Disclosure, *Review of Financial Studies* **2**, 495-526.
- Hellwig, F. (1980), On the Aggregation of Information in competitive Markets, *Journal of Economic Theory* **22**, 477-498.
- Hellwig, M. (1982), Rational Expectations Equilibrium with Conditioning on Past Prices: A Mean-Variance Example, *Journal of Economic Theory* **26**, 279-312.
- Milgrom, P. and N. Stokey (1982), Information, Trade and Common Knowledge, *Journal of Economic Theory* **26**, 17-27.
- Verrecchia, R. (1982), Information Acquisition in a Noisy Rational Expectations Economy, *Econometrica* **50**, 1415-1430.

Strategic behavior

- Bhattacharya, U. and M. Spiegel, (1991), Insiders, Outsiders, and Market Breakdowns, *Review of Financial Studies* **4**, 255-282.
- Biais, B., Martimort, D. and J-Ch. Rochet, (2000), Competing Mechanisms in a Common Value Environment, *Econometrica* **68**, 4, 799-837.
- Caballé, J. and M. Krishnan, (1994) Imperfect Competition in a Multi-security Market with Risk Neutrality, *Econometrica* **62**, 695-704.
- Glosten, L. (1989) Insider Trading, Liquidity and the Role of the Monopolist Specialist, *Journal of Business* **62**, 211-235.
- Glosten, L. (1994), Is the Electronic Open Limit Order Book Inevitable, *Journal of Finance* **69**, 1127-1161.
- Jackson, M. (1991) Equilibrium, Price Formation and the Value of Private Information *Review of Financial Studies* **4**, 1-16.
- Madhavan, A. (1992) Trading Mechanisms in Securities Markets, *Journal of Finance* **47**, 607-641.
- Spiegel, M. and A. Subrahmanyam, (1992), Informed Speculation and Hedging in a Noncompetitive Securities Market, *Review of Financial Studies* **5**, 307-329.

- Subrahmanyam, A., (1991), Risk Aversion, Market Liquidity, and Price Efficiency, *Review of Financial Studies* **4**, 416-441.
- Viswanathan, S. and J. Wang (1999), Market Architecture: Limit Order Books Versus Dealership Markets, *Journal of Financial Markets* **5**, 127-168.
- Back, K. (1992) Insider Trading in Continuous Time, *Review of Financial Studies* **5**, 387-409.
- Foster, F. D. and S. Viswanathan (1993), The effect of public information and competition on trading volume and price volatility, *Review of Financial Studies* **6**, 23-56.
- Foster, D. and S. Viswanathan (1996), Strategic Trading When Agents Forecast the Forecast of Others, *Journal of Finance* **51**, 1437-1478.
- Holden, C. and A. Subrahmanyam (1992), Long-Lived Private Information and Imperfect competition, *Journal of Finance* **47**, 247-270.
- Holden, C. and A. Subrahmanyam (1994), Risk Aversion, Imperfect Competition and Long-Lived Information, *Economic Letters* **44**, 181-190.
- Huddart, S., Hughes J.S. and C. B. Levine (2001), Public Disclosure and Dissimulation of Insider Trades, *Econometrica* **69**, 665-681.
- Vayanos, D (1999), Strategic Trading and Welfare in a Dynamic Market, *Review of Economic Studies* **66**, 219-254.

Insider trading

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- Fishman, M. and K. Hagerty (1992), Insider Trading and the Efficiency of Stock Prices, *Rand Journal of Economics* **23**, 106-122.
- Leland, E. (1992),Insider Trading: Should it be prohibited?, *Journal of Political Economy* **100**, 859-887.
- Maug, E. (2002),Insider Trading Legislation and Corporate Governance, *European Economic Review* **46**, 1569-1597.
- Maug, E. (1998), Large shareholders as Monitors: Is there a Trade-Off between Liquidity and Control?, *Journal of Finance* **53**, 65-97.
- John, K. and R. Narayanan (1997), Market manipulation and the role of insider trading regulations, *Journal of Business* **70**, 217-247.
- Rochet, J-Ch. and J. Vila, (1994) Insider Trading without Normality, *Review of Economic Studies* **61**, 131-152.

Trading Volume

- Blume, L., Easley, D. and M. O'Hara (1994), Market Statistics and Technical Analysis: The Role of Volume, *Journal of Finance* **49**, 153-181.
- Brown, D and R.H. Jennings (1989) On Technical Analysis, *Review of Financial Studies* **2**, 527-552.

- Campbell, J., S. Grossman, and J. Wang (1993), Trading Volume and Serial Correlation in Stock Returns, *Quarterly Journal of Economics* **108**, 905-939.
- Easley, D and M. OHara (1987), Price, Trade Size, and Information in Securities Markets, *Journal of Financial Economics* **19**, 69-90.
- Grundy, B. and M. McNichols (1989) Trade and Revelation on Information through Prices and Direct Disclosure, *Review of Financial Studies* **2**, 495-526.
- He, H. and J. Wang (1995), Differential Information and Dynamic Behavior of Stock Trading Volume, *Review of Financial Studies* **8**, 919-972.
- Lo, A.W. and J. Wang (2006), Trading Volume: Implications of an Intertemporal Capital Asset Pricing Model, *Journal of Finance*, forthcoming.
- Lo, A.W., Mamaysky H., and J. Wang (2004), Asset Prices and Trading Volume Under Fixed Transactions Costs, *Journal of Political Economy* **112**, 1054-1090.
- Wang, J. (1994), A Model of Competitive Stock Trading Volume, *Journal of Political Economy* **102**, 127-168.

Market manipulation

- Allen, F. and D. Gale (1992), Stock-price manipulation, *Review of Financial Studies* **4**, 443-481.
- Allen, F. and G. Gorton (1992), Stock-price manipulation, market microstructure and asymmetric information, *European Economic Review* **36**, 624-630.
- Brunnermeier, M. and L. Pedersen (2005), Predatory Trading, *Journal of Finance* **60**, 1825-1863.
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- Fishman, M. and K. Hagerty (1995), The mandatory disclosure of trades and market liquidity, *Review of Financial Studies* **8**, 637-676.
- Vila, J.L., (1989), Simple games of market manipulation, *Economic Letters* **29**, 21-26.

Market Efficiency

- Summers, Lawrence (1985), On economics and finance, *Journal of Finance* **40**, 633-635.
- Summers, Lawrence (1986), Does the stock market rationally reflect fundamental values? *Journal of Finance* **41**, 591-601.
- Shleifer, Andrei (1986), Do demand curves for stocks slope down, *Journal of Finance* **41**, 579-590.
- Froot, Kenneth and Emil Dabora (1999), How are stock prices affected by the location of trade? *Journal of Financial Economics* **53**, 189-216.
- Jensen, Michael (1978), Some anomalous evidence regarding market efficiency, *Journal of Financial Economics* **6**, 95-101.

- Klibanof, Peter, Owen Lamont and Thierry Wizman (1998), Investor reaction to salient news in closed-end country funds, *Journal of Finance* **53**, 673-699.
- Lamont, Owen and Richard Thaler (2003), Can the market add and subtract? Mispricing in tech stock carveouts, *Journal of Political Economy.*
- Lee, C.M., A. Shleifer and R. Thaler (1991), Investor sentiment and the closed-end fund puzzle, *Journal of Finance* **46**, 75-110.
- Mitchell, Mark, Todd Pulvino and Erik Stafford (2002), Limited arbitrage in equity markets, *Journal of Finance* **57**, 551-584.
- Rosenthal, L. and C. Young (1990), The seemingly anomalous price behavior of Royal Dutch Shell and Unilever N.V./PLC, *Journal of Financial Economics* **26**, 123-141.
- Froot, K., Schaferstein, D. and J. Stein (1992), Herd on the Street: Informational Inefficiencies in a Market with Short-Term Speculation, *Journal of Finance* **47**, 1461-1484.
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- Holden, C. and A. Subrahmanyam (1996), Risk Aversion, Liquidity, and Endogenous Short Horizons, *Review of Financial Studies* **9**, 691-722.

Differences of Opinion

- Harris and Raviv (1993), Differences of opinion make a horse race, *Review of Financial Studies* **6**, 473-506.
- Harrison and Kreps (1978), Speculative investor behavior in a stock market with heterogeneous expectations, *Quarterly Journal of Economics* **92**, 323-336.
- Hong and Stein (2003), Differences of Opinion, Short-Sales Constraints, and Market Crashes, *Review of Financial Studies* **16**, 487-525.
- Miller (1977), Risk, Uncertainty, and Divergence of Opinion, *Journal of Finance* **32**, 1151-1168.
- Morris, Stephen (1996), Speculative investor behavior and learning, *Quarterly Journal of Economics* **110**, 1111-1133.
- Scheinkman and Xiong (2003), Overconfidence and Speculative Bubbles, *Journal of Political Economy* **111**, 1183-1219.

Limits to Arbitrage

- De Long, Shleifer, Summers, and Waldman (1990), Noise Trader Risk in Financial Markets, *Journal of Political Economy* **98**, 703-738.
- De Long, Shleifer, Summers, and Waldman (1991), The Survival of Noise Traders in Financial Markets, *Journal of Business* **64**, 1-19.
- Gromb and Vayanos (2002), Equilibrium and Welfare in Markets with Financially Constrained Arbitrageurs, *Journal of Financial Economics* **66**, 361-407.

- Kogan, Ross, Wang, and Westerfield (2006), The Survival and Price Impact of Irrational Traders, *Journal of Finance* **61**, 195-229.
- Mitchell, Pulvino, and Stafford (2002), Limited Arbitrage in Equity Markets, The *Journal of Finance* **57**, 551-584.
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