

Market Microstructure

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Market Microstructure

Confronting Many Viewpoints

Edited by

Frédéric Abergel
Jean-Philippe Bouchaud
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Contents

Introduction	xi
About the Editors	xiii
PART I ECONOMIC MICROSTRUCTURE THEORY	
1 Algorithmic Trading: Issues and Preliminary Evidence	3
<i>Thierry Foucault</i>	
1.1 Introduction	3
1.2 What is algorithmic trading?	6
1.2.1 Definition and typology	6
1.2.2 Scope and profitability	11
1.3 Market structure and algorithmic trading	12
1.4 Costs and benefits of algorithmic trading	16
1.4.1 Algorithmic trading reduces search costs	16
1.4.2 Algorithmic trading has an ambiguous effect on adverse selection costs	19
1.4.3 Algorithmic trading and price discovery	20
1.4.4 Welfare effects	22
1.4.5 Algorithmic trading as a source of risk	24
1.5 Empirical evidence	26
1.5.1 Algorithmic trading and market liquidity	27
1.5.2 Algorithmic trading and volatility	29
1.5.3 Algorithmic trading and price discovery	31
1.5.4 Algorithmic trading and market stability	34

1.6	Conclusions	36
	Appendix	38
	Acknowledgment	39
	References	39

2 Order Choice and Information in Limit Order Markets **41**

Ioanid Roşu

2.1	Introduction	41
2.2	Order choice with symmetric information	42
2.3	Order choice with asymmetric information	48
2.4	The information content of orders	54
2.5	Questions for future research	57
	References	58

PART II HIGH FREQUENCY DATA MODELING

3 Some Recent Results on High Frequency Correlation **63**

Nicolas Huth and Frédéric Abergel

3.1	Introduction	63
3.2	Data description	64
3.3	Multivariate event time	66
3.3.1	Univariate case	66
3.3.2	Multivariate case	68
3.3.3	Empirical results	69
3.4	High frequency lead/lag	74
3.4.1	The Hayashi–Yoshida cross-correlation function	74
3.4.2	Empirical results	77
3.5	Intraday seasonality of correlation	80
3.5.1	Empirical results	82
3.6	Conclusion	85
	Acknowledgment	85
	References	85

4 Statistical Inference for Volatility and Related Limit Theorems **87**

Nakahiro Yoshida

4.1	Introduction	87
4.2	QLA for an ergodic diffusion process	88
4.3	QLA for volatility in the finite time-horizon	95
4.4	Nonsynchronous covariance estimation	98

4.4.1	Consistent estimator	98
4.4.2	Functional limit theorem	99
4.4.3	Application of YUIMA	101
4.4.4	Lead-lag estimation	102
4.5	YUIMA II for statistical analysis and simulation for stochastic differential equations	103
4.6	Higher order asymptotics and finance	105
4.6.1	Martingale expansion	105
4.6.2	Small σ expansion	107
	Acknowledgments	107
	References	108

PART III MARKET IMPACT

5 Models for the Impact of All Order Book Events **115**

Zoltán Eisler, Jean-Philippe Bouchaud, and Julien Kockelkoren

5.1	Introduction	115
5.2	A short summary of market order impact models	116
5.3	Many-event impact models	119
5.3.1	Notation and definitions	119
5.3.2	The transient impact model (TIM)	121
5.3.3	The history dependent impact model (HDIM)	122
5.4	Model calibration and empirical tests	125
5.4.1	Data	125
5.4.2	The case of large ticks	126
5.4.3	The case of small ticks	127
5.5	Conclusion	131
	Appendix	133
	Acknowledgments	134
	References	134

6 Limit Order Flow, Market Impact, and Optimal Order Sizes: Evidence from NASDAQ TotalView-ITCH Data **137**

Nikolaus Hautsch and Ruihong Huang

6.1	Introduction	137
6.2	Market environment and data	139
6.3	Major order flow and order book characteristics	141
6.4	An econometric model for the market impact of limit orders	145

6.4.1	A cointegrated VAR model for the limit order book	145
6.4.2	Estimating market impact	149
6.5	Market impact at NASDAQ	153
6.6	Optimal order size	157
6.7	Conclusions	160
	Acknowledgment	161
	References	161

PART IV OPTIMAL TRADING

Introduction: Trading and Market Micro-structure	165
<i>Charles-Albert Lehalle</i>	
References	169

7	Collective Portfolio Optimization in Brokerage Data: The Role of Transaction Cost Structure	171
	<i>Damien Challet and David Morton de Lachapelle</i>	
7.1	Introduction	171
7.2	Description of the data	172
7.3	Results	173
7.4	The influence of transaction costs on trading behavior from optimal mean-variance portfolios	176
7.5	Discussion and outlook	184
	Acknowledgments	185
	References	185

8	Optimal Execution of Portfolio Transactions with Short-Term Alpha	187
	<i>Adriana M. Criscuolo and Henri Waelbroeck</i>	
8.1	Introduction	187
8.2	Short-term alpha decay and hidden order arbitrage theory	190
8.3	Total cost definition and constraints	193
8.3.1	Equations without the risk term	193
8.3.2	Equations including risk without the alpha term	195
8.4	Total cost optimization	196
8.4.1	Results for $\lambda = 0$ and the arbitrary alpha term	196
8.4.2	Risk-adjusted optimization	202

8.5	Conclusions	206
8.5.1	Main results in the absence of short-term alpha	206
8.5.2	Main results with short-term alpha	207
8.5.3	Institutional trading practices	208
	Proviso	210
	References	210
	Combined References	213
	Index	227

Introduction

The accumulation of high frequency market data in recent years has revealed many surprising results. These results are interesting both from theoretical and practical standpoints. The mechanism of price formation is at the very heart of economics; it is also of paramount importance to understand the origin of the well-known anomalous ‘stylized facts’ in financial price series (heavy tails, volatility clustering, etc.). These issues are of obvious importance for practical purposes (organisation of markets, execution costs, price impact, etc.). This activity is also crucial to help the regulators, concerned with the organisation of liquidity in electronic markets and the issues raised by ‘high frequency trading’.

Correspondingly, this problem has been vigorously investigated by at least five different communities (economics, financial mathematics, econometrics, computer science and econo-physics), scattered in academic institutions, banks and hedge funds, with at present limited overlap and sometimes lack of visibility. On the other hand, due to the gigantic amount of available data, precise quantitative theories can now be accurately tested.

At the time where this conference series started in 2010, the interest for market microstructure had finally reached a stage where the interest for the theoretical breakthroughs of the pioneers in the field had become comparable to its practical importance for market practitioners. Thanks to the development of high frequency trading, market microstructure is now, not only a subject of theoretical modelling and simulation but, more interestingly maybe, a real practical field where a better model can make a big difference.

The organisers of the conference thought that it would be extremely fruitful to confront the ideas that have blossomed in those different

communities in the past decade. In order to foster this confrontation and ease communication, we have gathered researchers from these different communities, including professionals, and ask them to give introductory tutorials, reviewing both their recent activity and the problems that, in their eyes, are most relevant to address in the near future.

Our aim in setting up this friendly, knowledge-oriented confrontation has been to examine and compare possibly very different views on the nature of the mechanisms relevant to describe and understand what one can actually observe when scrutinising the tick-by-tick behaviour of markets. Such important questions as the interplay between liquidity taking and providing, the existence and characterisation of various types of market impact, the statistical tools designed to handle well the ‘tick’ effect, the ‘best-execution’ and other algorithmic trading strategies, or the question of market design and organisation . . . have been studied in-depth by the speakers at the conference, and their contributions to this present volume will help shed a new light, or, rather, new lights, on the market microstructure viewed as an object for scientific study as well as a wealth of information for price discovery and trading.

Frédéric Abergel
Jean-Philippe Bouchaud
Thierry Foucault
Charles-Albert Lehalle and
Mathieu Rosenbaum

About the Editors

Frédéric Abergel

After graduating from École Normale Supérieure in 1985 and completing a PhD in Mathematics in 1986, Frédéric Abergel started an academic career as a researcher with the CNRS. He spent ten years in the Mathematics Department of the University of Orsay Paris XI, where he obtained his habilitation degree in 1992. He then switched to the capital markets industry and became a ‘quant’ (quantitative analyst). During the second part of his career, Frédéric Abergel has worked for trading floors in various financial institutions, mainly in the derivatives sector, developing pricing and hedging models. In July 2007, he decided to return to Academia, where he now holds the BNP Paribas Chair of Quantitative Finance at École Centrale Paris. His research focuses on the study of empirical properties and mathematical model of market microstructure, high frequency data and algorithmic trading.

Jean-Philippe Bouchaud

Jean-Philippe Bouchaud graduated from the École Normale Supérieure in Paris, where he also obtained his PhD in physics. He was then appointed by the CNRS until 1992. After a year spent in the Cavendish Laboratory (Cambridge), he joined the Service de Physique de l’État Condensé (CEA-Saclay), where he worked on the dynamics of glassy systems and on granular media. He became interested in economics and theoretical finance in 1991. His work in finance includes extreme risk models, agent based simulations, market microstructure and price formation. He has been very critical about the standard concepts and models used in economics and in the financial industry (market efficiency, Black-Scholes models, etc.) He founded the company Science &

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Thierry Foucault

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Charles-Albert Lehalle

Currently Head of Quantitative Research at CA Cheuvreux, Charles-Albert Lehalle is an international expert in optimal trading. He published papers in international journals about the use of stochastic control and stochastic algorithms to optimise a trading flow with respect to flexible constraints. He also authored papers on post-trade analysis, market impact estimates and modelling the dynamics of limit order books. Charles-Albert Lehalle lectures at 'Paris 6 (El Karoui) Master of Finance' (École Polytechnique, ESSEC, École Normale Supérieure) and

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Mathieu Rosenbaum

Mathieu Rosenbaum obtained his PhD from Université Paris-Est in 2007. He is now Professor at Université Pierre et Marie Curie (Paris 6) and École Polytechnique and is a member of the CREST (Center of Research in Economics and Statistics). His research mainly focuses on statistical finance problems, such as market microstructure modeling or designing statistical procedures for high frequency data. Also, he has research collaborations with several financial institutions, in particular BNP-Paribas since 2004.