Liquidity and Efficiency during Unusual Market Conditions:

An Analysis of Short Selling Restrictions

and Expiration-Day Procedures

on the London Stock Exchange

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Statement of Originality

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text. I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Matthew Clifton

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Preface

Some three years ago, I was fortunate enough to be awarded a PhD scholarship from the CMCRC; an innovative research centre based in Sydney, Australia. One of the primary goals of the CMCRC is to harness the expertise of an extensive network of academics and industry specialists to enhance current understanding of the key drivers of market efficiency and fairness. In pursuit of these objectives, I have had the privilege of conducting much of my research while working at the LSE as an active member of regulatory, monitoring, and surveillance teams.

Through working with the LSE I have gained enormous insight into many operational aspects of a large stock exchange. While at the LSE I was involved in the investigation of various market design features including short selling restrictions, tick-size changes, and expiration-day effects. In completing this work it was necessary to characterise liquidity and trading activity to provide insights into the costs and benefits of market changes. I also analysed participant behaviour with respect to various regulations defined by the UK financial regulator, the Financial Services Authority (FSA). I was responsible for developing requirements and algorithms for monitoring and compliance purposes in areas such as off-book trade reporting and market maker presence. I also investigated various forms of market manipulation including insider trading, marking the close and layering (or 'spoofing'). Working with the surveillance team to develop automated detection methods of market abuse in real-time has been a highlight. Witnessing identified cases being referred to the FSA for further investigation was very rewarding.

It was a great pleasure and a privilege to have had the opportunity to contribute towards enhancing the efficiency and integrity of the LSE market. Through this experience I have gained much respect for the sensitive nature of market surveillance and as such, in this thesis I only

present a subset of my research endeavours; that which is considered suitable for public dissemination.

In addition to working at the LSE, I have also enjoyed immersing myself in the academic literature. This experience has served to broaden my understanding of the multitude of exciting research questions surrounding financial markets; many of which remain open and so many more that are yet to be conceived. The dramatic, dynamic and evolutionary nature of financial markets, combined with an abundance of readily accessible data makes ours a truly fascinating field of research.

During my doctoral candidature I have also been an active member of the CMCRC Market Quality team during my study leave return visits to Sydney. The Market Quality team comprises a group of fellow motivated research students, many of whom work abroad with stock exchanges and financial regulators, studying the ins and outs of different market designs all over the world.

Some of the work in this thesis has been presented as joint work. A study describing preliminary findings of the market impact of short selling restrictions co-authored with Mark Snape was among the first reports in the world to document the effects of emergency regulatory intervention into short sales and this work formed part of the LSE's response to the Committee of European Securities Regulators' (CESR) call for evidence on regulation of short selling[1]. A more detailed study of the effects of the UK short selling ban is presented in Chapter 3 of this thesis; a version of which was presented as a working paper co-authored with Prof. David Michayluk at various academic conferences including the European Finance Association Annual Meeting and the Annual Conference of the Multinational Finance Society.

[1] CESR call for evidence on regulation of short selling (January 20, 2009), http://www.londonstockexchange.com/about-the-exchange/regulatory/response-cers-call-evidence-short-selling.pdf, last accessed November 28, 2010.

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Abbreviations

AESP	Automatic Execution Suspension Period
BATS	BATS Europe (a pan-European alternative trading venue)
Chi-X	Chi-X Europe (a pan-European alternative trading venue)
CSER	Committee of European Securities Regulators
ECN	Electronic Communication Network
EDSP	Exchange Delivery Settlement Price
ETF	Exchange Traded Fund
FTSE	A share index of the most highly capitalised UK companies
FSA	Financial Services Authority (UK financial regulator)
LIFFE	London International Financial Futures and Options Exchange
LSE	London Stock Exchange
MiFID	Markets in Financial Instruments Directive
MTF	Multilateral Trading Facility
NYSE	New York Stock Exchange
PME	Price Monitoring Extension
RIE	Recognised Investment Exchange
RNS	Regulatory News Service
S&P 500	A share index of the most highly capitalised US companies
SEC	Securities and Exchange Commission (US financial regulator)
SETS	Stock Exchange Electronic Trading System
SIRCA	Securities Industry Research Centre of Asia-Pacific
UK	United Kingdom
US	United States of America

Abstract

While enhancing market quality has always been an important goal, this challenge has taken on even greater significance with increasing competition between securities markets both nationally and internationally. This thesis examines the influence of several key market design features on the market quality of the London Stock Exchange (LSE).

The first issue examined is the impact of regulatory changes to short selling constraints on liquidity and order flow during periods of extreme uncertainty. During the 2008-9 UK emergency temporary short selling ban, restricted stocks experienced lower trading activity, wider spreads, reduced order book depth, and more aggressive trading. The restrictions occurred at a time of extreme uncertainty when price volatility increased and there was more trading activity in the upstairs market. Our findings suggest that limit order trading may be less viable during turbulent times and should interest policymakers concerned with maintaining fair markets during crisis periods.

Second, this thesis examines trading conditions during another period of market strain; index derivatives expiration days. Previously unexamined, the LSE employs a unique intraday call auction procedure to minimise expiration-day effects on underlying stocks. Price and volume data is examined around the expiration of FTSE 100 index futures and option contracts to determine the efficacy of the UK approach. Evidence of significant increases in trading volume and abnormal stock returns in the underlying market on expiration days is found. However, the effects are short-lived and small relative to transactions costs, suggesting that use of an intraday call auction mechanism is effective in maintaining a fair and orderly market.

The third issue analysed in this thesis is whether current expiration-day procedures give rise to exploitable market efficiencies. Individual stock returns prior to expiration are found to help predict future prices in the short-term. This predictive ability is used to derive trading strategies which are tested under real-world conditions to search for systematic profitable trading opportunities. Although the model forecasts produce higher returns than a passive benchmark, the gains are small after allowing for transaction costs implying that LSE expiration-day procedures foster an efficient market.

This thesis has implications for economic efficiency and policy. Together, study of these distinctive market design features of the LSE and their respective impacts on liquidity and market efficiency contributes to an enhanced understanding of optimal market design. Our findings should interest academics and market operators concerned with maintaining fair and efficient markets, particularly during critical trading periods.