QUANTVALLEY /FDR RESEARCH INITIATIVE



2015

Activities and Events organized by the Research Initiative (QMI) – ANNUAL REPORT

This document describes the activities organized by the Quantitative Management Research Initiative (QMI) during its third year of existence.

For internal use only.

Draft January 2016

Table of Contents

1. INTRODUCTION	
1.1. The objectives of the QMI	6
1.2. Research axes of the QMI	6
1.3. The QMI's organization	8
The steering committee	8
The Advisory Board	8
The secretariat	.8
The QMI's researchers	.8
The QMI's associate researchers	11
3. RESEARCH ACTIVITIES	
3.1. Research Publications	
3.1.1. Working papers	
3.1.2. Published Papers	
3.1.3. Books and books' chapters	
3.2. QUANTVALLEY/Wiley Monographs	
3.2.3. Contagion phenomena with applications in finance	
3.3. Call for projects	
3.4. Completed projects	
4. RESEARCH EXPOSURE AND DIFFUSION	
4.1. Conference and seminar participation	
4.1.1. 9th CSDA International Conference (CFE 2015)	
4.1.2. Seminar and conference participations	
4.3. Annual Conference	
4.4. Seminars & workshops	
4.4.1. Systemic Risk, Singapore	
4.4.2. Risk-Based and Factor Investing, London	
4.6. Website	
5. ANNEXES	ERREUR ! SIGNET NON DEFINI.
5.1 Budget for 2015	Erreur ! Signet non défini.
5.2 Provisional Budget for 2016	Erreur ! Signet non défini.

QUANTVALLEY /FDR RESEARCH INITIATIVE "QUANTITATIVE MANAGEMENT INITIATIVE (QMI)"

1. INTRODUCTION

Hosted within the Fondation du Risque (FdR) and with the support of the Institut Louis Bachelier (ILB), the work conducted within the framework of this Research Initiative is principally carried out by teams from the University Paris-Dauphine and the ENSAE (Ecole Nationale de la statistique et de l'administration économique). It benefits from partnerships with GFI, UBS and QUANTVALLEY.



From left to right : Gaëlle Le Fol (Dauphine and CREST, Scientific Director of the QMI), Serge Darolles (Dauphine and CREST), Christian Gouriéroux (CREST), Fabrice Riva (Université Paris - Dauphine, General Secretary of the QMI), Jean-Michel Beacco (Fondation du Risque), Arnaud Chrétien (QUANTVALLEY), Marc Souffir (GFI), Patrice Lacourarie (UBS)

1.1. The objectives of the QMI

In the post-financial-crisis context, Quantitative Management professionals from the French Financial sector came together in 2010 to create QuantValley in order to promote Quantitative Finance and its benefits in terms of research, risk management and value creation for investors. Today, the association has been joined by two important partners, GFI and UBS, and is investing even more in the promotion of research and the development of interactions between the academic world and the Professional world of Quantitative management. Thanks to its support, the Quantitative Management Initiative (QMI) was born in early 2012 and is structured around the following themes:

- Developing quantitative research applied to asset management;
- Facilitating knowledge transfer between academic environments and asset management agents;
- Responding to the research issues of various private partners;
- Encouraging collaboration with one or more companies that are leaders in fields relating to quantitative management;
- Promoting the image of asset management based on quantitative approaches;
- Increasing and consolidating the high level of excellence of the partnerships by organising reflexion, research and training activities on an international scale relating to one or more themes of general interest;
- Reflecting on the evolution of regulation pertaining to asset management.

1.2. Research axes of the QMI

Amongst the research areas of most interest to the QMI are:

Statistical Signal Processing

Application of signal treatment to the estimation of factorial models, the detection of outliers, the filtering of trends and the robust estimation of Kalman models is an active research field of the IdR QMI. A « Quantitative asset management » session leaded by Rafael Molinero and including Emmanuel Jurczenko, Member of the QMI has been organised by the QMI for the Computational Financial Econometrics (CFE) conference in London on the 12, 13 and 14 December 2015 (page 20).

Listed market liquidity

Serge Darolles, Gaëlle Le Fol and Gulten Mero are working on dynamics measures of short-term and long-term liquidity measures based on the autocorrelation of return, volume and volatility. This research has been presented for the first time at the second QuantValley/QMI Annual Research Conference in Paris in November 2014 (page 25), then at the 6th French Econometrics Conference in Paris, at the Computational Financial Econometrics (CFE) conference in Pisa, Italy, in December 2014, and finally at the Paris Affi conference in December 2015.

A new research paper written by Adrien Becam, Serge Darolles and Gaelle Le Fol has been presented at the CFE conference in London.

Serge Darolles, Gaëlle Le Fol and Jean Michel Zakoian continue to work on liquidity adjusted conditional risk measure. A new version of this research was presented in Marseille in May 2016. Fabrice Riva is for his part, with two co-authors, working on ETF liquidity.

Algo and/or High frequency trading

Optimisation of the VWAP (Volume Weighted Average Price) price replication algorithms, link between the speed of placing orders on the market and the arrival of information, liquidity trade-offs, maximum trading capacity.

Vincent van Kervel and Albert Menkveld, from VU University of Amsterdam have received in 2013 funding of 5,000 for their project untitled Predatory trading in equity markets (page 18). This research has been presented at the second QuantValley/QMI Annual Research Conference in Paris in November 2014.

Algo and High frequency trading defenders say that they provide liquidity and improve price efficiency. Serge Darolles, Gaëlle Le Fol and Gulten Mero, in their liquidity paper, show that investors are acting strategically – by

slicing their orders - to avoid being picked-off by HFTs. Doing so, they slow down the propagation of information in the prices. Again, this research has been presented for the first time at the 6th French Econometrics Conference in Paris and finally at the Computational Financial Econometrics (CFE) conference in Pisa, Italy, in December. QMI organised a workshop on "Liquidity and the tick size" in London with Euronext (page 26).

Contagion and funds flows

A measure of liquidity comovements between the currencies of various emerging economies, link between currency liquidity and liquidity of dollar debt markets, impact of hedge fund flows on contagion phenomena between countries.

Several teams are working on this theme. Christian Gouriéroux and Patrick Gagliardini are working on modelling hedge fund default due to contagion effects. The article has been presented at the Conference on Systemic Risk in Singapore, in December 2015. Serge Darolles, Simon Dubecq and Christian Gouriéroux are working on project on the Contagion analysis in the banking sector, presented several times in 2014. Serge Darolles and Christian Gouriéroux have published in 2015 with Wiley the second volume of the QuantValley collection (page 17). Mardi Dungey and Eric Renault have also received funding of 10,000 euros by the QMI for their project on contagion modelling (page 18).

Risk disaggregation and portfolio allocation

Decomposition of a portfolio's asset's risk contribution into systematic risk contribution and idiosyncratic risk contribution, method of allocation controlling the relative proportion of either contribution. Application to index and market-neutral portfolio creation.

Christian Gouriéroux and Emmanuelle Jay take a new look at a well-known approach: risk parity. Parity is obtained for any form of risk measure (not only volatility) and by identifying the common and specific components of risk. This research was presented during the London QMI workshop in November 2015. Emmanuel Jurczenko has published the second volume of the QuantValley collection, published with Elsevier, the theme of which is also risk parity (page 17). Two papers for QMI researchers are included in this volume (page 26). During the same CFE conference, J.M. Zakoian has organized a session "Econometrics of dynamic portfolios and risks".

Directly Related to this subject, Dong Lou and Christopher Polk, from London School of Economics have presented their work on the booms and busts of beta arbitrage: measuring the extent of the low-beta crowd (page 18) during the QMI Annual Conference in November.

Trend Following Strategies

Nick Baltas from Imperial College have presented their work on Momentum strategies in futures markets and trendfollowing funds (page 18) during the QMI Annual Conference in November 2014. The corresponding paper is forthcoming in the BMI Hedge Funds Special issue co edited by Serge Darolles.

Machine learning & Classification techniques with application to trading systems

A research team from the University of Rotterdam headed by Professor Micheal McAleer funded by QMI in 2013 have presented the corresponding work on Artificial Intelligence approaches applied to the analysis of information diffused through traditional channels (Reuters news) during the QMI Annual Conference. This information is analysed so as to rank assets from various investment universes from best to worst (page 19).

Impact of quantitative trading on the economy

A senior research team from the University of Cergy-Pontoise funded in 2013 for a research project on a model of mortgage default risk (page 19) have presented the corresponding work during the QMI Annual Conference

New sources of information (Google, Twitter, ...)

The University of Rotterdam's project (mentioned above) also relates to this theme. A paper on the statistical analysis of big data has been presented at the world congress of the Econometric Society in Montreal by Christian Gouriéroux.

1.3. The QMI's organization

The steering committee__

The steering committee reviews, monitors and prioritizes major QMI projects.

Scientifique Director

Gaëlle Le Fol, Professor, Université Paris-Dauphine and CREST

General Secretary

Fabrice Riva, Professor, Université Paris - Dauphine

Researchers from l'ENSAE and Université Paris-Dauphine

Serge Darolles, Professor, Université Paris -Dauphine

Christian Gouriéroux, Professor, CREST-ENSAE ParisTech and Université de Toronto

Elyès Jouini, Professor, Université Paris-Dauphine

Other Members

Emmanuel Bacry, CNRS and Ecole Polytechnique

Emmanuel Jurczenko, Professeur associé, ESCP Paris

Mathieu Rosenbaum, Professeur, Université Paris VI

The Advisory Board__

The Advisory board assists the Steering Committee in its supervising tasks over the activities of the project. The advisory Board members are:

Representing UBS : Patrice Lacourarie Representing GFI : Marc Souffir Representing QUANTVALLEY : Arnaud Chrétien and Serge Darolles Representing ENSAE : Antoine Frachot Representing the Université Paris-Dauphine : Laurent Batsch Representing the Louis Bachelier Institut: Stéphane Buttigieg Representing the Risk Fondation: Jean-Michel Beacco

Qualified Person: Michel Crouhy (Natixis)

International Experts: René Garcia (Edhec), Michael Rockinger (University of Lausanne), and Ronnie Sadka (Boston College)

The secretariat__

Pauline de Saint Quentin, the secretary of QMI can be contacted at <u>contact@qminitiative.org</u> or <u>pauline.desaintquentin@dauphine.fr</u> or by telephone: +33 1 41 16 76 19.

The QMI's researchers_____



E. Bacry, CNRS and Ecole Polytechnique



P. Duvaut, Telecom Paristech



C. Gouriéroux, CREST and Toronto University



J. Dudek, CREST and Université Paris-Dauphine



S. Darolles, Université Paris - Dauphine



J.-M. Zakoïan, CREST and University Lille 3.



E. Jay, QamLab



E. Jurczenko, ESCP Europe



G. Mero, Université de Cergy-Pontoise



E. Jouini, Université Paris - Dauphine



G. Le Fol, Université Paris - Dauphine and CREST



F. Riva, Université Paris- Dauphine



M. Rosenbaum, UMPC and Ecole Polytechnique



M. Zoican, Université Paris Dauphine

The QMI's associate researchers_



Akindynos-Nikolaos Baltas, Visiting Researcher, Imperial College, Quantitative Analyst at UBS Investment Bank



D.E. Allen, Econometric Institute, Erasmus School of Economics, Erasmus University Rotterdam, The Netherlands.



Mardi Dungey, School of Economics and Finance, University of Tasmania, Australia



D. Keenan, Professor of Finance, Université de Cergy-Pontoise



Robert Kosowski, Professor, Center for Hedge Fund Research & Risk Management Laboratory at Imperial College Business School



Dong Lou, Financial Markets Group, London School of Economics



M. McAleer, Professor of Quantitative Finance, Econometric Institute, Erasmus School of Economics, Erasmus University Rotterdam



Albert Menkveld, Professor, VU University of Amsterdam



Christopher Polk, Professor, Financial Markets Group, London School of Economics



Abhay Kumar Singh, PhD (Finance), MBA, B. Tech (I T)



Eric Renault, Professor, Brown University, USA



Vincent L. van Kervel, VU University of Amsterdam

3. RESEARCH ACTIVITIES

This research initiative aims to be a means of exchange and reflexion where research themes emerge naturally, and become the starting point of research articles in the best international journals. The QMI must also be able to create a research community around themes of interest to management companies by calling for research projects nationally and internationally and by reinforcing the QMI member teams by recruiting research assistants and publishing doctoral contracts.

3.1. Research Publications

- Date: 2015
- Themes: Quantitative Management

3.1.1. Working papers

Allen, D.E., McAleer, M. and Singh A.K., An entropy based analysis of the relationship between the DOW JONES Index and the TRNA Sentiment series. Working paper.

Allen, D.E., McAleer, M. and Singh A.K., Daily Market News Sentiment and Stock Prices. Working Paper.

Auray, S., and C., Gourieroux: Procyclicité des régulations Financières, CREST Working Paper.

Bacry E., and J.-F. Muzy, Hawkes model for price and trades high-frequency dynamics, Working paper, submitted to SIAM Journal of Financial Mathematics.

Baltas A.-K., and R. Kosowski, Momentum Strategies in Futures Markets and Trend-following Funds. Working paper.

Becam, A., Darolles. S. and Le Fol, G., Serial correlation and time-varying liquidity in the hedge fund industry, QMI Working paper.

Becam, A., Darolles. S. and Le Fol, G., Smoothed Returns and Managers' skills, QMI Working paper.

Borgy, V., Idier, J. and Le Fol, G., Liquidity Problems in the FX market: Ask for the BIL, Working paper SSRN.

Cai, J., M. Fukasawa, M. Rosenbaum and P. Tankov, Optimal discretization of hedging strategies with directional views, Working Paper.

Calamia, A., Deville L. and Riva, F., Liquidity in ETFs: What really Matters?, Working Paper.

Darolles, S., Dubecq, S., and C., Gourieroux. Contagion analysis in the banking sector. Working paper.

Darolles, S. Dudek, J. and Le Fol, G., Liquidity risk and contagion for liquid funds, Working paper Université Paris – Dauphine.

Darolles, S. Dudek, J. and Le Fol, G., MLiq a Meta Liquidity Measure, working paper Université Paris -Dauphine.

Darolles, S., Francq, C., Le Fol, G. and J.M. Zakoian. Liquidity risk estimation in conditional volatility models. Working paper, submitted to Annals of Economics and Statistics.

Darolles, S., Gagliardini, P., and C., Gourieroux: Survival of Hedge Funds: Frailty vs Contagion.

Darolles, S., Gourieroux, C. and Jay, E., Robust Portfolio Allocation with Systematic Risk Contribution Restrictions. Working paper SSRN.

Darolles S., G. Le Fol, and Mero G., Financial Market Liquidity: Who is acting strategically. Working paper SSRN, Revise and re-submit Journal of Econometrics.

Darolles, S. and Vaissié, M., The Benefits of Dynamic Risk Management: Mitigating Downside Risk Without Compromising Long-Term Growth Prospects, Working paper SSRN.

Dungey, M. and E. Renault, Identifying Contagion. Mimeo.

Duvaut, P. and Jay, E., ODERIM (Outlier Detection for Risk Management), Mimeo.

Francq, C. and J.M. Zakoïan, Joint inference on market and estimation risks in dynamic portfolios. MPRA paper 68100.

Gagliardini, P., Gourieroux, C., and M., Rubin, Positional Portfolio Management, Mimeo.

Gatheral J., T. Jaisson, and M., Rosenbaum, Volatility is rough, Working paper.

Gourieroux, C., and J.C., Heam, Funding Liquidity Risk in a Regulatory Perspective, CREST Working paper.

Gourieroux, C., and J., Jasiak, Misspecification of Causal and Noncausal Orders in Autoregressive Processes, submitted Journal of Econometrics.

Gourieroux, C., and Y., Lu, Long Term Care and Longevity, CREST Working Paper.

Gourieroux, C., and A., Monfort, Revisiting Identification and Estimation in Structural VARMA Models, CREST DP.

Huang W., C.-A. Lehalle, and M. Rosenbaum, How to predict the consequences of a tick value change? Evidence from the Tokyo Stock Exchange pilot program, Working paper.

Jurczenko E., T. Michel and J. Teiletche, "Generalized Risk-Based Investing", Working Paper SSRN.

Jurczenko E. and J. Teiletche, "Active Risk-Based Investing", Working Paper SSRN.

Lou D., and C. Polk, The Booms and Busts of Beta Arbitrage: Measuring the extent of the Low-Beta Crowd. Mimeo.

Menkveld, A. and V. van Kervel, Predatory Trading in Equity Markets. Mimeo.

Menkveld, A., E. Pagnotta and M. Zoican, "Does Central Clearing affect Price Stability? Evidence from the Nordic Equity Markets", Working paper and SSRN 2350762, Revise and resubmit at the Journal of Financial Economics.

Mero G, "Measuring Hedge Fund Performances: A Markov Regime Switching with False Discoveries Approach", Working Paper.

Rosenthal D. W. R., Trading-Related Skill Across Investment Funds, Mimeo.

3.1.2. Published Papers

Bacry E., A.luga, M.Lasnier, C-A.Lehalle, Market impacts and the life cycle of investors orders. Forthcoming in Market Microstructure and Liquidity (2015).

Bacry E., I. Mastromatteo, and J.-F. Muzy, Hawkes processes in finance. Market Microstructure and Liquidity Vol. 01, No. 01, 1550005 (2015).

Darolles, S. and C., Gourieroux. The effect of management and provision accounts on hedge fund returns, International Journal of Approximate Reasoning65, 2015, 45–58.

Darolles, S., Gourieroux, C., and J., Teiletche (2015) : "The Dynamics of Hedge Funds Performance", in *Econometrics of Risk*, ed. Huynh, Kreinovich, Songsak, Heidelberg, p85-113

Darolles S., Le Fol, G. and Mero G., Measuring the liquidity Part of Volume. Journal of Banking and Finance, 50, 92-105, 2015.

Dayri, K. and Rosenbaum, M., Large tick assets: implicit spread and optimal tick size, in Market Microstructure and Liquidity, 1 (1), 1550003, 2015.

Francq, C. and J.M. Zakoïan, Risk-parameter estimation in volatility models. Journal of Econometrics, 184 (1), p.158-173, 2015.

Francq, C. and J.M. Zakoïan, Estimating multivariate GARCH models equation by equation. Forthcoming in the Journal of the Royal Statistical Society: Series B (Statistical Methodology).

Gourieroux, C., and A., Hencic (2015) : "Noncausal Autoregressive Model in Application to Bitcoin/USD Exchange Rates", in *Econometrics of Risk*, ed. Huynk, Kreinovich, Songsak, Heidelberg.

Gourieroux, C ., and J., Jasiak, Filtering, Prediction and Estimation of Noncausal Processes, forthcoming in Journal of Time Series Analysis.

Gourieroux, C., and Y., Lu, Love and Death: A Freund Model with Frailty, Insurance: Mathematics and Economics, 63, 191-203, 2015.

Gourieroux, C., and A., Monfort, Pricing with Finite Dimensional Dependence. Journal of Econometrics, 187 (2), 408-417, 2015.

Gouriéroux, C. and J.M. Zakoïan, On uniqueness of moving average representations of heavy-tailed stationary processes. Journal of Time Series Analysis, 36, 876-887.

Huang W., C.-A. Lehalle and M. Rosenbaum, Simulating and analyzing order book data: The queue-reactive model, Journal of the American Statistical Association, 110 (509), p 107-122, 2015.

Li, D., Ling, S. and J.M. Zakoïan, Asymptotic inference in multiple-threshold double autoregressive models. Journal of Econometrics, 189, 415-427.

Jurczenko, E., T. Michel and J. Teiletche "A unified framework for risk-based investing", Journal of Investment Strategies, vol 4 (4), 1-29, 2015.

3.1.3. Books and books' chapters

RISK-BASED INVESTING BUT WHAT RISK(S)? in E. Jurczenko (ed), « Risk-Based and Factor Investing», ISTE/Elsevier, 147-171.

E. Jurczenko, Ecole Hoteliere de Lausanne, Member of QMI **J. Teiletche**, Unigestion



Abstract: In this article, we propose a generalized risk-based investing framework, which allows us to deal in a simple and flexible way with various risks beyond volatility and correlation, namely valuation, asymmetry, tail and illiquidity risks. We empirically illustrate the methodology by proposing a riskbased strategic allocation for a multi-asset portfolio made of bonds, equities, commodities, realestate, hedge funds and private equity over the period 1990–2013.

ROBUST PORTFOLIO ALLOCATION WITH SYSTEMATIC RISK CONTRIBUTION RESTRICTIONS in E. Jurczenko (ed), « Risk-Based and Factor Investing», ISTE/Elsevier, 123-146.

S. Darolles, Université Paris – Dauphine, Member of QMI



Edited by Emmanuel Jurca

STE

C. Gouriéroux, University of Toronto and CREST, Member of QMI

E. Jay, ...

Abstract: In this article, we propose a generalized risk-based investing framework, which allows us to deal in a simple and flexible way with various risks beyond volatility and correlation, namely valuation, asymmetry, tail and illiquidity risks. We empirically illustrate the methodology by proposing a riskbased strategic allocation for a multi-asset portfolio made of bonds, equities, commodities, realestate, hedge funds and private equity over the period 1990-2013.



SPECIAL ISSUE "THEORETICAL AND FINANCIAL ECONOMETRICS: ESSAYS IN HONOR OF CHRISTIAN GOURIEROUX,"

Special issue "Theoretical and financial econometrics: essays in honor of Christian Gourieroux," forthcoming

S. Darolles, Université Paris – Dauphine, Member of QMI

co-guest editor with A. Monfort and E. Renault, Journal of Econometrics, forthcoming.

SPECIAL ISSUE "NEW DEVELOPMENTS IN THE MODELING AND THE FORECASTING OF EXTREME **RISKS IN FINANCE,"**

Special issue "New developments in the modeling and the forecasting of extreme risks in finance," forthcoming

- S. Darolles, Université Paris Dauphine, Member of QMI
- S. Laurent, IAE Aix-en-Provence and GREQAM

SPECIAL ISSUE ON HEDGE FUNDS, SPECIAL ISSUE BANKERS, MARKETS AND INVESTORS



Special issue on hedge funds, guest editor for Bankers, Markets and Investors, forthcoming 2016

S. Darolles, Université Paris – Dauphine, Member of QMI

RB.

3.2. QUANTVALLEY/Wiley Monographs

- Date: 2015
- Themes: Quantitative Management

The QUANTVALLEY collection, published by Wiley, aims to bring together a set of monographs, short and related to the themes of interest to quantitative management. The target audience is management company employees as well as Masters students specialising in Finance.

3.2.1. Risk-Based and Factor Investing

E. Jurczenko, ESCP Europe, Member of QMI, Editor ISTE/Elsevier, 1st Edition 2015, 486 pages.



This book is a compilation of recent articles written by leading academics and practitioners in the area of risk-based and factor investing (RBFI).

The articles are intended to introduce readers to some of the latest, cutting edge research encountered by academics and professionals dealing with RBFI solutions. Together the authors detail both alternative non-return based portfolio construction techniques and investing style risk premia strategies.

Each chapter deals with new methods of building strategic and tactical risk-based portfolios, constructing and combining systematic factor strategies and assessing the related rules-based investment performances. This book can assist portfolio managers,

asset owners, consultants, academics and students who wish to further their understanding of the science and art of risk-based and factor investing.

3.2.3. Contagion phenomena with applications in finance

S. Darolles, Université Paris – Dauphine, Member of QMI

C. Gourieroux, University of Toronto and CREST, Member of QMI.



ISTE/Elsevier, 1st Edition 2015, 166 pages.

Much research into financial contagion and systematic risks has been motivated by the finding that cross-market correlations (resp. coexceedances) between asset returns increase significantly during crisis periods. Is this increase due to an exogenous shock common to all markets (interdependence) or due to certain types of transmission of shocks between markets (contagion)?

Darolles and Gourieroux explain that an attempt to convey contagion and causality in a static framework can be flawed due to identification problems; they provide a more precise definition of the notion of shock to strengthen the solution within a dynamic

framework.

This book covers the standard practice for defining shocks in SVAR models, impulse response functions, identitification issues, static and dynamic models, leading to the challenges of measurement of systematic risk and contagion, with interpretations of hedge fund survival and market liquidity risks

3.3. Call for projects

No call in 2015.

Identifying Contagion, Professor M.Dungey, School of Economics and Finance, University of Tasmania, Australia and Professor E. Renault, Brown University, USA

3.4. Completed projects

 Momentum strategies in futures markets and trend-following funds, Professor R. Kosowski, Center for Hedge Fund Research & Risk Management Laboratory at Imperial College Business School and A.-K. Baltas, Visiting Researcher, Imperial College, Quantitative Analyst at UBS Investment Bank.

In this paper, we rigorously establish a relationship between time-series momentum strategies in futures markets and commodity trading advisors (CTAs) and examine the question of capacity constraints in trend-following investing. First, we construct a very comprehensive set of time-series momentum benchmark portfolios. Second, we provide evidence that CTAs follow time-series momentum strategies, by showing that such benchmark strategies have high explanatory power in the time-series of CTA index returns. Third, we do not find evidence of statistically significant capacity constraints based on two different methodologies and several robustness tests. Our results have important implications for hedge fund studies and investors.

On-line working paper presentation: "<u>Momentum strategies in futures markets and trend-following</u> <u>funds</u>". This paper has been presented at the QMI annual conference, Paris, November 2014.

2. The booms and busts of beta arbitrage: measuring the extent of the low-beta crowd, D. Lou, Financial Markets Group, London School of Economics and Professor C. Polk, Financial Markets Group, London School of Economics

Historically, low-beta stocks deliver high average returns and low risk relative to high-beta stocks, offering a potentially profitable investment opportunity for professional money managers to "arbitrage" away. We argue that beta-arbitrage activity in turn generates booms and busts in the strategy's abnormal trading profits. In times of relatively little activity, the beta-arbitrage strategy exhibits delayed correction, taking up to three years for abnormal returns to be realized. In stark contrast, in times of relatively-high activity, short-run abnormal returns are much larger and then revert in the long run. Importantly, we document a novel positive-feedback channel operating through firm-level leverage that facilitates these boom and bust cycles. Namely, when arbitrage activity is relatively high and beta-arbitrage stocks are relatively more levered, the cross-sectional spread in betas widens, resulting in stocks with relatively low limits to arbitrage (large, liquid stocks with low idiosyncratic risk), consistent with excessive arbitrage activity destabilizing prices.

On-line working paper: "<u>The booms and busts of beta arbitrage</u>". This paper has been presented at the QMI annual conference, Paris, November 2014.

3. **Predatory trading in equity markets**, V. van Kervel, VU University of Amsterdam and Professor A. Menkveld, VU University of Amsterdam.

This paper tests whether High-Frequency Traders (HFTs) follow market making or predatory trading strategies around the execution of institutional parent orders. For large institutional orders we observe

that the net inventory positions of the HFTs follow the predatory trading pattern of Brunnermeier and Pedersen (2005). That is, with a delay, the HFTs increase their inventory positions when the institutions are buying and decrease them when the institutions are selling. We observe HFT market making for parent orders that are relatively small and last a short period of time. A matched samples analysis reveals that the HFTs always follow market making strategies on trading days with similar characteristics but without an active institution. Finally, in the cross-section of institutional parent orders, a proxy of predatory trading is strongly correlated with execution costs, after controlling for common characteristics that affect execution costs.

V. Ven Kervel has presented a preliminary version off the paper "<u>Do High-Frequency Traders Engage</u> in Predatory Trading?" at the QMI annual conference, Paris, November 2014.

4. *Machine Learning, Sentiment indices and Stock Market Prices,* Professor M. McAleer, Professor D.E. Allen and Dr. A.K. Singh, Econometric Institute, Erasmus School of Economics, Erasmus University Rotterdam, The Netherlands.

Abstract : The focus of this study is to develop theories that can underpin information mining on the web to produce reliable information and to assess the impact of existing methods on the behaviour of market prices using techniques that are based upon the concept of entropy.

The framework for the analysis will be provided by information theory. The major metrics will be constructed on the application of concepts related to Shannon entropy and cross entropy. The data for the study will be drawn from Thomson Reuters market data provided by The Securities Industry Research Centre of the Asia Pacific (SIRCA).

Two working papers are online

- a. "<u>An entropy based analysis of the relationship between the DOW JONES Index and the TRNA</u> <u>Sentiment series</u>",
- b. "Daily Market News Sentiment and Stock Prices".
- Contagious Defaults: Evidence from Subprime Mortgages, Professor D. Keenan, Professor A. Heinen, and M.-L. Kim, Université de Cergy Pontoise, France.

Abstract: The object of this project is to study default dependence and contagion amongst nonagency securitized mortgages in the US over the period 1998-2011. We will use a Cox proportional hazard model in a competing risk framework for default (and prepayment) and a copula model for the dependence amongst individual hazards. Dependence between defaults can occur because of geographical proximity, common economic conditions, which may be of either a local or economy-wide nature, the business cycle, interest rates, etc. We want to quantify the amount of this default dependence and investigate the reasons why such dependence occurs.

Online working paper: "Contagion in Subprime Mortgage Defaults: a Composite Likelihood Approach"

4. RESEARCH EXPOSURE AND DIFFUSION

Over and above research production, the QMI aims to distribute quantitative management academic research throughout the scientific community but also towards quantitative management professionals (knowledge diffusion). To this end, the QMI's research will be presented in international conferences, within the framework of an annual conference addressed to academics and professionals. Furthermore, training (research applications) will be developed and the website will propose research articles and webinars than put that research into practice.

4.1. Conference and seminar participation

4.1.1. 9th CSDA International Conference (CFE 2015)

Organization of one session at the Computational and Financial Econometrics, London, UK, December 2015

- Quantitative asset management, session C0470.
 - S. Darolles, Organizer, Université Paris-Dauphine, Member of the QMI
 - R. Molinero, Chairman and organizer,
 - Using quantitative risk management as a trading tool in a commodities trading company
 S. Boutaleb, Invivo Trading
 - A speculative volume based covariance model for currency portfolios
 G. Bagnarosa, ESC Rennes
 - Serial correlation and time-varying liquidity in the hedge fund industry A. Becam, Université Paris – Dauphine
 - Active risk-based investing
 Emmanuel Jurczenko, Ecole Hoteliere de Lausanne, Member of the QMI
- Econometrics of dynamic portfolios and risk, C0540
 - J.-M. Zakoian, Chairman and organizer, CREST, Member of the QMI
 - Real uncertainty and the zero lower bound
 G. Rousselet, NYU Stern School of Business
 - Filtered historical simulations for estimating the conditional risk of a dynamic portfolio
 C. Francq, CREST and University Lille III
 - Deep conditional portfolio sorts
 B. Moritz, Ludwig Maximilian University of Munich
 - On the empirical saddlepoint approximation with application to asset pricing,
 B. Holcblat, BI Norwegian Business School

4.1.2. Seminar and conference participations

QMI's researchers have presented their work at several conferences and seminars:

"Active Risk-Based Investing", Jurczenko E. and J. Teiletche (2014), QMI WP

- UBS Quantitative Conference, London, March 25-26.
- Citi Global Quant Research Conference, Lisbon, June 10-12.
- QMI Risk-based and Factor Investing Conference, November 5th.
- CFE Conference, London, December 12-14.

"Clarifying the ambiguous role of HFT in liquidity provision", S. Darolles, G. Le Fol and G. Mero

• 6th Financial Econometrics Conference, Paris, December 4-5, 2014.

"Contagion analysis in the banking sector", S. Darolles, S. Dubecq and C. Gouriéroux

• CFE Conference, Pisa, December 2014

"Double Instrumental Variable Estimation of Interaction Models", P. Gagliardini and C. Gourieroux

- 6th French Econometrics Conference, Paris, December 2014
- World Meeting of the Econometric Society, Montreal, August, 17-21, 2015

"Estimating the conditional VaR of a portfolio of multivariate GARCH returns." C.Francq, J-M. Zakoïan

• 8th International Conference of the Thailand Econometric Society, Chiang Mai, Thailand, January 2015.

"Estimating multivariate GARCH and Stochastic Correlation models equation by equation." C.Francq, J-M. Zakoïan

- Seminar at CREATES, Aarhus University, April 2015.
- IMS Finance, Insurance, Probability and Statistics workshop. Rutgers University, June 2015.
- Econometric Society World Conference. Montreal, August 2015.
- Computational and Financial Econometrics (CFE'15), London, December 2015.

"Estimation of Hawkes Kernels of High-Frequency Dynamics", E. Bacry

• The CFM-Imperial Workshop, Invited speaker, London, December 2015.

"Explosive Bubble Modelling by non-causal Process." C. Gouriéroux and J-M. Zakoïan

- Computational and Financial Econometrics (CFE'14), Pisa, Italy, December 2014.
- Workshop on Statistics and Inference, Coimbra (Portugal), February 2015.
- Workshop "Nouveaux développements dans la modélisation et la prévision des risques extrêmes en finance". Marseille, mai 2015.
- "Advances in Time Series and Forecasting", ESSEC Business School. November 2015.

"Filtering and Prediction of Noncausal Processes",

• Time Series Meeting, ESSEC, November 6, 2015

"Financial market liquidity: Who is acting strategically?", S Darolles, G Le Fol and G Mero

- 8th International Conference on Computational and Financial Econometrics (CFE 2014), Pisa, Italy, 6-8 December 2014.
- AFFI, Paris, Decembre 2015

"Liquidity risk and contagion for liquid funds", S. Darolles, J. Dudek and G. Le Fol

 Workshop « Nouveaux développements dans la modélisation et la prévision des risques extrêmes en finance », Marseille, May 18-19.

"Misspecification of Causal and Noncausal Orders in Autoregressive processes",

• CFE-CM Statistics, London ,December 12 2015

"Noncausal Autoregressive Model in Application to Bitcoin /US\$ Exchange Rates",

• Thailand Econometric Society, Chiang Mai, January 2015.

"Revealing high-frequency dynamics using Hawkes processes", E. Bacry

• DataLead Conference, Paris 5-6 November 2015

"Revisiting Identification and Estimation in Structural VAR Models",

- Keynote presentation,8 th Financial Risk Forum, Paris, March 30-31,2015
- French Econometrics, Aix-Marseille, May 18, 2015
- Financial Econometric Conference, Toulouse School of Economics, Toulouse, May 22-23, 2015

"Serial correlation and time-varying liquidity in the hedge fund industry", Becam A., D. Darolles and G. Le Fol, QMI WP

• CFE Conference, London, December 12-14.

"Survival of hedge funds: Frailty vs contagion", S. Darolles, P. Gagliardini and C. Gouriéroux

- New Frontiers in Systemic Risk Measures and Extreme Risk Management, Brooklyn Institute, New-York, June 4, 2015
- "Survival of hedge Funds", UCLA, Los-Angeles, 2015

"Simulating and analyzing order book data: the queue-reactive model ", M. Rosenbaum, W. Huang, and C. Lehalle, forthcoming in Journal of the American Statistical Association.

• CFE conference, Pisa, Italy, December 2014.

"The determinants of ETF liquidity: Theory and evidence from European markets", A. Calamia, L. Deville and F. Riva, QMI WP,

- CFE Pisa, December 6, 2014.
- ETF Research Academy Conference, London, November 4, 2015.

"Tracking illiquidities in daily and intradaily characteristics", Darolles S., G. Le Fol and, G. Mero, QMI WP

• CFE Pisa, December 6, 2014.

" Volatility is rough", Gatheral J., Thibault J., and M. Rosenbaum

- Conference Market Microstructure Confronting Many Viewpoint 3, Paris, December 10, 2014.
- CFE conference, Pisa, December 6, 2014

4.3. Annual Conference

There has been no annual conference in 2015 but the next QMI' annual conference is scheduled on March 17, 2016. The theme of this conference is "Liquidity and funding risk".

4.4. Seminars & workshops

Over and above research production, the QMI aims to distribute quantitative management academic research throughout the scientific community but also towards quantitative management professionals (knowledge diffusion). To this end, QMI organizes seminars to present new, effective investment techniques being developed by academicians and practitioners. After the success of the Geneva' Risk-based Portfolio Construction workshop, we organized the following worshops.

4.4.1. Systemic Risk, Singapore.

This event has been organized by the University Paris – Dauphine, the Essec Business School and the Singapoore Management University with the support of European Commission, Labex Louis Bachelier, l'Institut Français de Singapour and QMI/QuantValley Research Project. It took place: ESSEC Asia-Pacific, 2, One-North Gateway, Singapore 138502, 11-12 December.

100 registered persons.

FRIDAY, 11 DECEMBER 2015

9.00am - 9.25am: Registration

9.25am-9.30am: Welcome address

Martine Bronner, Dean of ESSEC Asia-Pacific

9.30am-10.30am : Risk-based portfolio construction - session 1

Chair: Jun Yu (Singapore Management University)

- Peter C. B. Phillips (Yale University): Asymptotics of the HP Smoother

10.30am – 11.00am: Coffee Break

11.00am–12.30pm: Contributed Session 1

Chair: Cheng Liu (Wuhan University)

- Serge Darolles (Université Paris-Dauphine and QMI): Contagion and Systematic Risk: an Application to the Survival of Hedge Funds

- Laura Parisi (Universita di Pavia): Modeling Systemic Risk with Correlated Stochastic Processes

- Cheng Liu (Wuhan University): A Combination of Low and High Frequency Data in Portfolio Study

12.30pm – 1.30pm: Lunch Break

1.30pm-3.30pm: Contributed Session 2

Chair: Haoxi Yang (Nankai University)

- Xingguo Luo (Zhejiang University): The Dynamic Correlations among the G7 and China: Evidence from both Realized and Implied Volatilities

- Michael Stutzer (University of Colorado): Entropy in Financial Contagion Research

- Haoxi Yang (Nankai University): Implications of Returns Predictability across Horizons for Asset Pricing Models

- Jeroen Rombouts (ESSEC Business School and CREST), Sparse Change-Point Time Series Models

3.30 pm – 4.00pm: Coffee Break

4.00pm-5.30pm: Invited Session 1

Chair: Junye Li (Essec Business School)

- Christian Brownlees (Universitat Pompeu Fabra): Community Detection in Partial Correlation Networks

- Yoosoon Chang (Indiana University): A New Approach to Regime Switching

7.00pm - 9.00pm: Conference Dinner | Venue: The Halia @ Botanic Gardens

SATURDAY, 12 DECEMBER 2015

9.30am–10.30am : Keynote Speech

Chair: Andras Fulop (Essec Business School)

- Yacine Ait-Sahalia (Princeton University): A Hausman Test for the Presence of Market Microstructure Noise in High Frequency Data 10.30am - 11.00am: Coffee Break

11.00am–12.30pm: Contributed Session 3

Chair: Yalin Gunduz (Deutche Bundesbank)

- Jun Kyung Auh (Georgetown University): The Role of Margin and Spread in Secured Lending: Evidence from the Bilateral Repo Market

- Yalin Gunduz (Deutche Bundesbank): Mitigating Counterparty Risk

- Jun Yu & Liang Jiang (Singapore Management University): New Methodology for Constructing Real Estate Price Indices Applied to the Singapore Residential Market

12.30pm – 1.30pm: Lunch Break

1.30pm-3.30pm: Contributed Session 4

Chair: Ser-Huang Poon (Manchester Business School)

- Francesco Violante (Aarhus University): Modelling dynamics of variance risk premia

- Ser-Huang Poon (Manchester Business School): News Analyses of International Stock Markets Jumps

- Andras Fulop (ESSEC Business School): Parameter Uncertainty, Volatility Dynamics and Variance Risk Premium Estimation

- **Tao Huang** (Shanghai Advanced Institute of Finance): R&D Information Quality and the Cross-Section of Stock Returns

3.30 pm – 4.00pm: Coffee Break

4.00pm-5.30pm: Invited Session 2

Chair: Gaëlle Le Fol (Université Paris-Dauphine and QMI)

- Jin-Chuan Duan (National University of Singapore): Non-Gaussian Bridge Sampling with an Application

- Joon Y Park (Indiana University): Econometric Analysis of Continuous Time Asset Pricing Models

4.4.2. Risk-Based and Factor Investing, London.

At the heart of the asset management industry, risk based portfolio construction and factor investing will be taken up by the presentation of several academic papers recently published in a book on these themes. This event has been organized by the QMI/QuantValley Research Project and Imperial College London Business School, with the support of Unigestion, CFA Society of the UK and UBS. It took place: LGS (Lecture Theatre Lower Ground Square), Imperial College Business School, South Kensington Campus, London SW7 2AZ, Thursday 5 November.

50 registered persons.

8.30am - 9.00am: Registration

9.00am-9.30am: Opening address

Alex Michaelides, Imperial College Business School Emmanuel Jurczenko, EHL and QMI Fiona Frick, Unigestion David Jessop, UBS

9.30am-11.00am : Risk-based portfolio construction - session 1

Chair: David Jessop (UBS)

Thierry Roncalli (Lyxor Asset Management): <u>Smart beta : choosing the right diversification constraint in minimum variance portfolios</u>
 <u>Discussion</u>: Marie Brière (Amundi)
 Jérôme Teiletche (Unigestion): <u>Risk-based investing but what risks?</u>
 <u>Discussion</u>: Daniel Giamouridis (Athens University of Economics and Business)

11.00am – 11.15am: Coffee Break

11.15am–12.45pm: Risk-based portfolio construction – session 2

Chair: Jérôme Teiletche (Unigestion)

Nick Baltas (UBS): <u>Trend-following meets risk-parity</u>
 <u>Discussion</u>: Rafael Molinero (Molinero Capital Management)
 Bernd Scherer (Deutsche Bank Asset Management): <u>Frictional diversification costs : evidence from a panel of fund of hedge fund holdings</u>
 <u>Discussion</u>: Thierry Michel (Lombard Odier)

1.00pm – 2.00pm: Lunch Break

2.15pm-4.15pm: Factor investing session

Chair: Gaëlle Le Fol (Université Paris – Dauphine and QMI)

- Raul Leote de Carvalho (BNP Paribas Investment Partners): Low risk anomaly everywhere : evidence from equity sectors

<u>Discussion</u>: James Sefton (Imperial College)
 - Felix Goltz (ERI Scientific Beta, EDHEC Risk Institute): <u>Designing multi-factor equity portfolios</u>
 <u>Discussant</u>: Michael Steliaros (Bank of America Merrill Lynch)
 - Serge Darolles (Université Paris-Dauphine & QMI): <u>Robust allocation with systematic risk contribution</u>
 restrictions
 <u>Discussion</u>: Tristan Froidure (TOBAM)

4.15pm – 4.45pm: Coffee Break

4.45pm-5.45pm: Define and implement factor investing: panel session

Moderator: Barbara Petitt (CFA Institute)

- David Buckle (Fidelity)

- David Jessop (UBS)
- Alexei Jourovski (Unigestion)
- Lise Renelleau (Axa Investment Managers)

5.45pm – 7.00pm: Cocktail

4.6. Website

The goal of the website is to become a showcase for the QMI and to encourage exchange between research and professionals by becoming for example a public library of research articles and computer code relating to quantitative management themes. Address: QMinitiative.org.

The website is a way to manage the annual conference and workshops registrations. Moreover, it is continuously updated.

