QUANTVALLEY /FDR RESEARCH INITIATIVE

2016

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 February 2017

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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 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 Serge Darolles, Member of the QMI has been organised by the QMI for the Computational Financial Econometrics (CFE) conference in Sevilla on the 12-14 December 2016 (page 19).

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 several times in international conferences (page 20) and is conditionally accepted in Journal of Econometrics (page 15).
Taking another look at serial correlations, Adrien Becam, Serge Darolles and Gaelle Le Fol are working on hedge funds liquidity and managers' skills (page 13).
Serge Darolles, Gaëlle Le Fol and Jean Michel Zakoian work, with another co-author, on liquidity adjusted conditional risk measure. This research was presented in Stockholm in June 2016 (page 21) and has been published in Annals of Economics and Statistics in December (page 15). Fabrice Riva is for his part, with two co-authors, working on ETF liquidity (page 13).
A « Managing Liquidity » session leaded by Gaëlle Le Fol, Member of the QMI has been organised by the QMI for the Computational Financial Econometrics (CFE) conference in Sevilla on the 12-14 December 2016 (page 19). This also was the topic of the QMI Annual conference and particularly of the panel session (page 23).

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 17). This research has been presented at the second QuantValley/QMI Annual Research Conference in Paris in November 2014 and is now completed.

Algo and High frequency trading defenders say that they provide liquidity and improve price efficiency. Serge Darolles, Gaëlle Le Fol and Gulten Mero, in a new 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 several times in international conferences (page 20).
Marius Zoican and his co-author Marlene D. Haas the Josseph de la Vega Prize 2016 of the The Federation of European Securities Exchanges (FESE)for their working paper "Discrete or continuous trading? HFT competition and liquidity on batch auction markets" (page 14). Marius Zoican, with some co-authors, has two papers on speed he has been presenting at several seminars and international conferences (pages 20-22). One of them, writin with Albert Menkveld is forthcoming in Review of Financial Studies (page 15).

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.

Mardi Dungey and Eric Renault have also received funding of 10,000 euros by the QMI for their project on contagion modelling. This project is now completed (page 19) and this research has been presented at the QMI annual conference (page 23).

Risk disaggregation and portfolio allocation

Decomposition of a portfolio's asset's risk contribution into systematic risk contribution and idiosyncratic risk contribution, market risk and liquidity risk, method of allocation controlling the relative proportion of either contribution. Application to index and market-neutral portfolio creation.
Until recently the liquidity of financial assets has typically been viewed as a second-order consideration. Liquidity was frequently associated with simple transaction costs that impose effect on asset prices, and whose shocks could be easily diversified away. Yet the evidence suggests that liquidity is now a primary concern. Serge Darolles, Gaëlle Le Fol and Jean-Michel Zakoïan in their research aim at disentangling market risk and liquidity risk in the context of conditional volatility models. Their approach allows the isolation of the intrinsic liquidity of any asset, and thus makes it possible to deduce a liquidity risk even when volumes are not observed. This research was presented in Stockholm in June 2016 (page 21) and has been published in Annals of Economics and Statistics in December (page 15). Fabrice Riva is for his part, with two co-authors, working on ETF liquidity (page 13).
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 17) during the QMI Annual Conference in March.

Trend Following Strategies
Nick Baltas from Imperial College have presented their work on Momentum strategies in futures markets and trend-following funds (page 17) during the QMI Annual Conference in November 2014. The corresponding paper has been published in the BMI Hedge Funds Special issue co-edited by Serge Darolles (page 16).

Big data, machine learning and the 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 several international conferences (page 20) by Christian Gouriéroux. This research will be published soon in Journal of Econometrics (page 15). QMI organized a workshop on "New challenges for Big Data in Economics and Finance" together with the University of Toronto and the Fileds Institue in Toronto in November (pages 24-26).

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

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

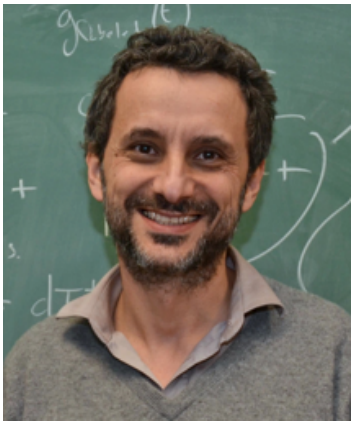
Qualified Person: Michel Crouhy (Natixis)

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

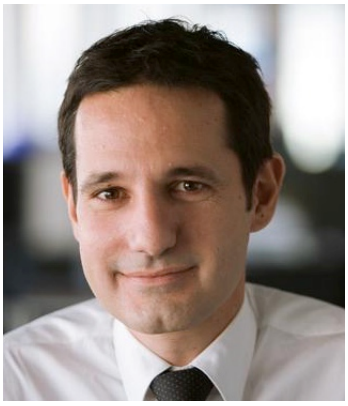
The secretariat

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

The QMI's researchers



E. Bacry, CNRS and Ecole Polytechnique



S. Darolles, Université Paris - Dauphine

P. Duvaut, Telecom Paristech

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

C. Gouriéroux, CREST and Toronto University

E. Jay, QamLab

J. Dudek, CREST and Université Paris-Dauphine

E. Jurczenko, ESCP Europe

G. Mero, Université de Cergy-Pontoise

E. Jouini, Université Paris - Dauphine

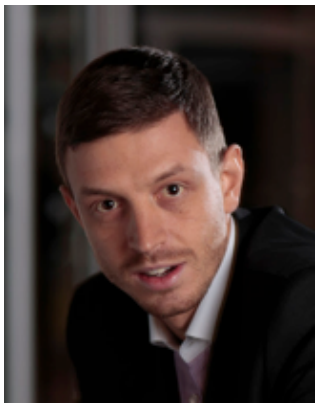
G. Le Fol, Université Paris - Dauphine and CREST

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: 2016
- 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.

Allard, M., Bronsard, C., and C. Gourieroux, Aversion to Impatience, Uncertainty and Illiquidity", submitted Annals of Economics and Statistics.

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

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.

Calamia, A., Deville L. and F. Riva, The Provision of Liquidity in ETFs: Theory and Evidence from European Markets, 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., MLiq a Meta Liquidity Measure, working paper Université Paris - Dauphine.

Darolles, S., C. Francq and S. Laurent. Asymptotics of Cholesky GARCH Models and Time-Varying Conditional Betas", Working paper, submitted to Journal of Econometrics.

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

S. Darolles, G. Le Fol and R. Sun, Liquidity Risk and Investor Behavior: Issues, Data and Models", Working paper.

Darolles S., and G. Roussellet, Hedge fund portfolio management with illiquid assets, working paper.

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

Deville, L., J. Raposo, and F. Riva, "Event studies and (endogenous) zero returns", working paper.

Dungey, M. and E. Renault, Identifying Contagion. QMI' Working paper.

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

Francq, C., and J.M., Zakoian, Joint Inference on Market and Estimation Risks in Dynamic Portfolio", Working paper.

Francq, C., and J.M., Zakoian, Expected Shortfall Estimation in Volatility Models", Working paper.

Gagliardini, P., Gourieroux, C., and M., Rubin, Positional Portfolio Management, Working paper. submitted *Journal of Financial Econometrics*.

Gourieroux, C., and J.C., Heam, "Funding Liquidity Risk in a Regulatory Perspective", submitted *Journal of Banking and Finance*.

Gourieroux, C., and J., Jasiak, Misspecification of Noncausal Order in Autoregressive Processes", R&R *Journal of Econometrics*.

Gourieroux, C., Jasiak, J., and A., Monfort, Stationary Dynamic Equilibria in Rational Expectations Models", submitted *Journal of Econometrics*.

Gourieroux, C., and Y., Lu, " Long Term Care and Longevity", R&R, *Journal of Econometrics*.

Gourieroux, C., and A., Monfort (2016), Economic Scenario Generators and Incomplete Markets", CREST Working paper.

Gourieroux, C., Monfort, A., and J.M., Zakoian (2016), Pseudo-Maximum Likelihood and Lie Groups of Linear Transformation", submitted *Econometrica*.

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

Haas M. D. and M. A. Zoican (2016), Beyond the Frequency Wall: Speed and Liquidity on Batch Auction Markets, Working paper. This paper received the Josseph de la Vega Prize 2016.

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.

Jurczenko E. and J. Teiletche, "Risk-based Investing: but what Risk(s)", Working paper.

Khapko M. and M. Zoican, 'Smart' Settlement, Working Paper SSRN.

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

Menkveld, A. and V. van Kervel, High-Frequency Trading around Large Institutional Orders. Working paper.

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., F. Lillo, M. Rambaldi (2016), The role of volume in order book dynamics: a multivariate Hawkes process analysis, Quantitative Finance, Dec. 2016, p. 1-22.

Cai, J., M. Fukasawa, M. Rosenbaum and P. Tankov, (2016), Optimal discretization of hedging strategies with directional views, *SIAM Journal of Financial Mathematics*, 2016, 7 (1), p. 34-69.

Darolles S., The rise of FinTechs and their regulation, (2016), Financial Stability Review 20, 85-92.

Darolles, S. Dudek, J. and G. Le Fol, (2016), Gauging Liquidity Risk in Emerging Market Bond Index Funds, Annals of Economics and Statistics, 123/124, p. 247-269.

Darolles, S., Francq, C., Le Fol, G. and J.M. Zakoian, (2016), Intrinsic liquidity in conditional volatility models. Annals of Economics and Statistics, 123/124, p 225-245.

Darolles S., G. Le Fol, and Mero G., Mixture of Distribution Hypothesis: Analyzing daily liquidity frictions and information flows. Working paper SSRN, conditionally accepted in Journal of Econometrics.

Darolles, S. and Vaissié, M., Diversification at a Reasonable Price, conditionally accepted, Bankers, Markets & Investors.

Francq, C., Horvath, L., and J.M., Zakoian (2016), Variance Targeting Estimation of Multivariate GARCH Models, Journal of Financial Econometrics, 14, 353-381.

Francq, C., O. Wintenberger, and J.M., Zakoian (2016), Goodness of Fit Test for Log-GARCH and EGARCH Models, Test, published online http://link.springer.com/article/10.1007/s11749-016-0506-2

Francq, C., and J.M., Zakoian (2016), Estimating multivariate volatility models equation by equation, Journal of the Royal Statistical Society, B, 78, 613-631.

Francq, C., and J.M., Zakoian (2016): Looking for efficient QML estimation of conditional value-at-risk at multiple risk levels. Annals of Economics and Statistics 123/124, 9–28, 2016.

Gagliardini, P., and C., Gourieroux (2016), Spread Term Structure and Default Correlation", Annals of Economics and Statistics, 123, 175-224.

Gagliardini, P., and C., Gourieroux (2016), Double Instrumental Variable for Interaction Models with Big Data", forthcoming Journal of Econometrics.

Gourieroux,C ., and J., Jasiak (2016), Filtering, Prediction and Estimation of Noncausal Processes, forthcoming Journal of Time Series Analysis.

Gourieroux,C ., and J., Jasiak (2016), Misspecification of Causal and Noncausal Orders in Autoregressive Processes", forthcoming *Journal of Econometrics*.

Gourieroux,C ., and J., Jasiak (2016), Semi-Parametric Estimation of Noncausal Vector Autoregression, forthcoming, *Journal of Econometrics*.

Gourieroux, C., and A., Monfort (2016), The Double Default Value of the Firm Model, Journal of Credit Risk, 12,47-76.

Gourieroux, C., Monfort, A., and J.P., Renne (2016), Statistical Inference for Independent Component Analysis", forthcoming, *Journal of Econometrics*.

Gourieroux, C., Nguyen, H., and T., Sriboonchitta (2016), Nonparametric Estimation of a Scalar Diffusion From Discrete Time Data: A Survey, *Annals of Operations Research*, July.

Gourieroux, C., and J.M., Zakoian (2016): Local Explosion Modelling by Noncausal Cauchy Autoregressive Process, forthcoming, *Journal of the Royal Statistical Society*.

Le Fol, G., and B. Méhouas (2016), Liquidité et risque de liquidité, Revue Banque, p. 42-46.

Menkveld, A. and M. Zoican, (2016). Need for Speed? Exchange Latency and Liquidity. Forthcoming in Review of Financial Studies.

Riva, F. (2016), Les ETF sont-ils vecteurs de risqué systémique?, forthcoming in Option Finance.

3.1.3. Books and books' chapters

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," Annals of Economics and Statistics, 123-124, 2016.

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, 140, Jan. –Feb. 2016

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

3.2. QUANTVALLEY/Wiley Monographs

- Date: 2016
- 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.

No published monograph but a new monograph on "Risk premia and factor investing", edited by **E. Jurczenko,** Ecole hôtelière de Lausanne and QMI Member should be published in 2017.

3.3. Call for projects

No call in 2016.

3.4. Completed projects

1. ***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: "Momentum strategies in futures markets and trend-following funds". 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 remaining in beta-arbitrage positions significantly longer. Our findings are exclusively 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: "The booms and busts of beta arbitrage". 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 "Do High-Frequency Traders Engage 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. "*An entropy based analysis of the relationship between the DOW JONES Index and the TRNA Sentiment series*",
   b. "*Daily Market News Sentiment and Stock Prices*".

5. ***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"

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

   Abstract: Identifying contagion effects during periods of financial crisis is known to be complicated by the changing volatility of asset returns during periods of stress. Genuine contagion involves a combination of increased volatility for all assets and an asymmetric effect where the volatility of the recipient increases more than the source. To untangle this we propose a GARCH com- mon features approach, where systemic risk emerges from a common factor source (or indeed multiple factor sources) with contagion evident through possible changes in the factor loadings relating to the common factor(s). Within a portfolio mimicking factor framework this can be identified using moment conditions. We use this framework to identify contagion in three illustrations involving both single and multiple factor specifications; to the Asian currency markets in 1997-98, to US sectoral equity indices in 2007- 2009 and to the CDS market during the European sovereign debt crisis of 2010-2013. The results reveal the extent to which contagion effects may be masked by not accounting for the sources of changed volatility apparent in simple measures such as correlation.

   Online working paper: "Identifying Contagion"

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. 10th CSDA International Conference (CFE 2016)

Organization of one session at the Computational and Financial Econometrics, Sevilla, Spain, December 2016

- Quantitative asset management, session C0309.

S. Darolles, Chairman and organizer, Université Paris-Dauphine, Member of the QMI

- Currency carry trade and the cross section of hedge fund returns
  A. Becam, Université Paris-Dauphine
- Joint inference on market and estimation risks in dynamic portfolios
  J.M. Zakoian, CREST and Member of the QMI
- Measuring hedge fund performance: A Markov regime-switching with false discoveries approach
  G. Mero, Université Cergy - Pontoise and Member of the QMI
- About the risks of alternative risk premia
  Guillaume Monarcha, Orion Financial Partners

- Inference in time series volatility models, C0369

J.-M. Zakoian, Chairman and organizer, CREST, Member of the QMI

- Inferring volatility dynamics and risk premia from the S& P 500 and VIX markets
  E. Gourier, Queen Mary University of London
- Cholesky-GARCH, theory and application to conditional beta
  S. Darolles, Université Paris-Dauphine, Member of the QMI
- Goodness-of-fit tests for log and exponential GARCH models
  C. Francq, CREST and University Lille III
- Noncausal heavy-tailed AR(p) processes
  S. Fries, CREST

- Managing liquidity, C0501

Gaëlle Le Fol, Chairman and organizer, Université Paris-Dauphine, Member of the QMI

- Event-studies and (endogenous) zero returns
  F. Riva, Université Paris-Dauphine, Member of the QMI
- Cholesky-GARCH, theory and application to conditional beta
  R. Sun, Université Paris-Dauphine
- Financial market liquidity: Who is acting strategically
  G. Le Fol, Université Paris-Dauphine, Member of the QMI
- Multivariate Hawkes processes: A microscope for high-frequency order book dynamics
  S. M. Rambaldi, CMAP - Ecole Polytechnique

4.1.2. Seminar and conference participations

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

"Active Risk-Based Investing"

- International Risk Forum, Paris, Mach.

"A new time-varying parameter autoregressive model for U.S. inflation expectations", C. Gourieroux and J. Jasiak

- CFE, Sevilla, December.

"Asymptotics of Cholesky GARCH Models and Time-Varying Conditional Betas", S. Darolles, C. Francq and S. Laurent.

- CFE, Sevilla, December.

"Beyond the Frequency Wall: Speed and Liquidity on Batch Auction Markets", Haas M., and M. Zoican

- EUROFIDAI Paris Finance December Meeting, Paris, France
- Northern Finance Association Conference, Mont Tremblant, Canada.
- 8th IFABS Conference, Barcelona, Spain.
- 6th NYU Stern Microstructure Meeting, New York, United States,
- Invited seminar at Bank of England, (scheduled in March 2017)

"*Bubble Modelling by Noncausal Process*", J.M. Zakoian

- TES, Chiang Mai, Keynote speaker, January.

- Econometrics and Financial Statistics, Valparaiso, August.
- JEF, Rabat, Keynote speaker, November.

"Conditional VaR estimation for dynamic portfolios driven by multivariate GARCH models", J.M. Zakoian

- Conference in honor of Lajos Horvath, Graz University of Technology, Austria, October.

"Double Instrumental Variable for Interaction Models with Big Data", Gagliardini, P., and C., Gourieroux

- Financial Econ. Boston, September.
- CESG, London (Ontario), October.
- New Challenges for Big Data, Fields Inst., Toronto, November.

"Event studies and (endogenous) zero returns", L. Deville, J. Raposo, F. Riva

- CFE, Sevilla, December.

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

- Computational Financial Econometrics, CFE, Sevilla 9-11 Decembre 2016.
- 9th Annual SoFiE Conference, Hong Kong, 15 June 2016.

"Gestion modélisée ou Gestion fondamentale : Quelles définitions ? ", G. Le Fol

- Université d'été de l'Asset Management, Paris, Août 2016.

"Hedge fund portfolio management with illiquid assets", S. Darolles, and G. Roussellet.

- EHL Finance Seminar, Lausanne, 15 April 2016.
- AFFI Conference, HEC Liege, 24 May 2016.
- ESEM Conference, Geneva, 24 August 2016.

"Intrinsic liquidity in conditional volatility models", S. Darolles, C. Francq, G. Le Fol and J.M. Zakoian,

- Multinational Finance Society Seminar, 26 June 2016, Stockholm

"Joint Inference on Market and Estimation Risks in Dynamic Portfolio", Francq, C., and J.M., Zakoian

- Financial Econometrics, Toulouse, May.
- ISNPS, Avignon, June.
- CFE, Sevilla, December.

"Liquidity Risk and Investor Behavior: Issues, Data and Models", S. Darolles, G. Le Fol and R. Sun.

- AFG, Paris
- Conseil Scientifique de l'AMF, Paris, 4 Avril 2016.
- Journées des Chaires de l'ILB, Paris, 24 June 2016.
- New Challenges for New Data in Economics and Finance, Toronto, 11 November 2016.

"Local Explosion Modelling by Noncausal Process", Gourieroux, C., and J.M., Zakoian

- ICABE, Nanterre Univ., September.
- Economics Seminar, Copenhagen, October.

"Misspecification of Causal and NonCausal Orders in Autoregressive Processes", Gourieroux,C ., and J., Jasiak

- CIREQ Econometric Conference, Montréal, May.

"Measuring Hedge Fund Performance: A Markov Regime Switching with False Discoveries Approach"

- 23rd Annual Conference of the Multinational Finance Society (MFS), Stockholm, June.
- 33rd International Conference of the French Finance Association (AFFI), Liège, May.
- 10th International Conference on Computational and Financial Econometrics (CFE), Seville, December.

"Need for Speed? Exchange Latency and Liquidity", Menkveld, A. and M. Zoican

- AEA in Chicago, January 2017
- Invited seminar at Manchester Business School, March.

"Pseudo-Maximum Likelihood and Lie Groups of Linear Transformations", Gourieroux, C., Monfort, A., and J.M., Zakoian

- Meeting in Honor of T. Bollerslev, Toulouse, May.

"Semi-Parametric Estimation of Noncausal Vector Autoregression", Gourieroux,C ., and J., Jasiak

- SOFIE, Brusssels, July.
- CFE-CM Statistics, Seville, December.

"'Smart' Settlement", Khapko M. and M. Zoican

- Invited seminars at Stockholm Business School , January 2017.
- Invited seminars at ESCP Paris, (scheduled in February 2017)
- SFS Cavalcade 2017 North America, Nashville, TN, United States (scheduled in May 2017)
- FIRN Sydney Market Microstructure Meeting, Sydney, Australia (scheduled in April 2017)
- 10th Financial Risks International Forum, Paris, France (scheduled in March 2017)

"Structural Dynamic Analysis of Systematic Risk", Calvet, L., Czellar V. and C., Gourieroux

- Toulouse Business School, January (Conference in Honour of N. Nalpas).
- International Risk Forum, Paris, March.
- GRI-Fields Conference on the Stability of Financial Systems, Toronto, June.
- SOFIE, Hong-Kong, June.
- Fields Institute, Toronto, July.
- Financial Econ. Seminar, Boston Univ., September.
- Financial Econometrics, Duke Univ., September.

"The role of volume in order book dynamics: a multivariate Hawkes process analysis", Bacry E., F. Lillo and E. Bacry and M. Rambaldi

- CFE-CM Statistics, Seville, December.

4.3. Annual Conference

Every year, the QMI organises a conference in the autumn. Intended for quantitative management experts – academics, professionals and journalists – it will aim to combine the research undertaken by members of the QMI, projects financed by the QMI and research by internationally renowned researchers, by organising a guest session and presentation sessions for research articles. A roundtable has also been organised in which academics, journalists and professionals will be invited to take part in a debate.

Date, location: March 2016 (Paris)

- Themes: Quantitative Management

The QuantValley/Quantitative Management Initiative (QMI)'s first objective is to favor synergies between quantitative management firms, academia and market authorities in order to achieve excellence in research. To optimize the cooperation between professionals and researchers, the initiative organizes workshops and conferences with the support of its academic partners, Université Paris-Dauphine and ENSAE- the French National School of Statistics and Administration. The first QuantValley/QMI Annual Research Conference will explore and present new findings on the following topics: Statistical Signal Processing, Market Liquidity, High Frequency Trading, Contagion and Systemic Risk, Risk Parity, and more generally all subjects dealing with Portfolio and Risk Management.

Venue :
Université Paris – Dauphine
Place du Maréchal de Lattre de Tassigny, 75016 Paris

Program 2016

March 17, 2016

9:00 am	Registration
9:20 am	Opening address by **G. LE FOL** (Dauphine and Scientific Director of QMI)
9:30– 11:00 am	Invited Session 1 – "Structural Dynamic Analysis of Systematic Risk", L. Clavet, V. Czellar, and **C. Gouriéroux** (Univ. Toronto, CREST & QMI) Discussant: Tba – "Strategic Interaction between Hedge Funds and Prime Brokers", N. Gerasimova, and **E. Jondeau** (HEC Lausanne) Discussant: ***O. Toutain*** (Banque de France)
11:00 – 11:30 am	Coffee break
11:30 – 12:30 pm	Keynote session 1 – "Identifying Contagion", **M. Dungey** (Univ. Of Tasmania) and E. Renault
12:30 – 2:00 pm	Lunch break
2 : 00 – 3 : 30 pm	Invited Session 2 – "Transparency Regime Initiatives and Liquidity in the CDS Market", **A.**

	Fulop (ESSEC Business School) and L. Lescourret Discussant: ***J. Dudek*** (Lutetia Capital and QMI) – "Does Central Clearing affect Price Stability? Evidence from the Nordic Equity Markets", A. Menkveld, E. Pagnotta, and **M. Zoican** (Univ. Paris – Dauphine and QMI) Discussant: ***G. Mero*** (Univ. Cergy-Pontoise and QMI)
3:30 – 4:00pm	Coffee break
4:00 – 5:00 pm	Invited Session 3 – "Portfolio rho-presentativity", **T. Froidure** (TOBAM) – "Returns drives for CTAs : Is volatility beneficial for CTAs? ", **R. Molinero** (Molinero Capital)
5 : 00 – 6:00 pm	Keynote Session 2 – "Close-Out Risk Evaluation: Integrating liquidity and market risk", **R. Cont** (Imperial College of London)
7 : 00 – 8 : 30 pm	Panel Session, co-organized by **the** Master 203 – Financial Markets, (in French) "Liquidity and Funding risks", with the participation of : – **E. Brard**, (Global Head of Fixed Income at Amundi) – **P. Guillot** (Executive Director of the Markets Directorate at AMF) – **S. Giordano** (Chairman of AMAFI)
8 : 30 pm	Cocktail

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.

New Challenges for Big Data in Economics and Finance.

This event has been organized by the University Paris – Dauphine, the University of Toronto with the support of the Fields Institute and QMI/QuantValley Research Project. It took place: **Fileds Institute, University of Toronto, Canada, November 11-12, 2016**

The recent increase of computational technology allows for collection of "Big data". "Big data" is a term for data set that is so large or complex that traditional methods of analysis are inadequate. The goal of this conference is to bring expert from economics and finance to discuss the challenges that large data sets present, the questions such data might help us answer, and present the new avenues of research related to this issue.

FRIDAY, 11 NOVEMBER 2016

9.00am–10.20am: Networks

Chair: **Prosper Dovonon** (Concordia Univ.)

- **Stephane Gaiffas** (Ecole Polytechnique): "*Introduction to Machine Learning, Application to Hawkes Processes*".
- **Yves Atchadé** (University of Michigan): "*Bayesian Inference of Exponential Random Graph Models for Large Social Networks*".

10.20am – 10.50am: Coffee Break

11.00am–12.30pm: Contributed Session 1

Chair: **Victor Aguirregabiria** (Univ. of Toronto)

- **Sanjog Misra** (Chicago Booth): "*Big Data and Marketing Analytics in Gaming: Combining Empirical Models and Field Experimentation*".
- **Christian Gouriéroux** (Univ. of Toronto & QMI): "*Double IV Estimation of Factor Model with Application to Big Data*".

12.10pm – 1.20pm: Lunch Break

1.20pm–2.40pm: Statistical Inference

Chair: **René Garcia** (Univ. Montréal)

- **Nancy Reid** (Univ. of Toronto): "*Approximate Likelihoods*"
- **Ivana Komunjer** (Univ. California San Diego): "*Statistical Inference on Manifolds*".

2.40 pm – 4.00pm: Asset Management

Chair: **Angelo Melino** (Univ. of Toronto)

- **Ronnie Sadka** (Boston College): "*What do measures of real-time corporate sales tell us about earnings surprises and post-announcement returns?".*
- **Serge Darolles** (Univ. Paris – Dauphine & QMI): "*Liquidity Risk and Investor Behavior: Issues, Data and Models*".

4.00pm–4.20pm: coffee break

4:20pm-5:20pm: Panel session: big data opportunities and challenges

Chair: **Gaëlle Le Fol** (Univ. Paris – Dauphine & QMI)
- **Hicham Hajhamou,** AQR
- **Axel Pierron,** Opimas
- **Ronnie Sadka,** Boston College

6.30pm – 8.30pm: Conference Dinner

SATURDAY, 12 NOVEMBER 2016

9.30am–10.20am : Causal inference

Chair: **Yuanyuan Wan** (Univ. of Toronto)

- Ivan Fernandez-Val (Boston University): "*Program Evaluation and Causal Inference with High-Dimensional Data*".
- Alberto Abadie (Harvard University): "*The Risk of Machine Learning*"

10.30am – 11.00am: Coffee Break

11.00am–12.30pm: Factor Models

Chair: **Silvia Goncalves** (Univ. of Western Ontario)

- **Marc Hallin** (Univ. Libre de Bruxelles): "*Networks, dynamic factors, and the volatility analysis of high-dimensional*
nancial series".
- **Jianqing Fan** (Princeton Univ.): "*Validating Market Risk Factors and Forecasting Bond Risk Premia using Innovated Factor Models*".

12.30pm – 2.00pm: Lunch Break

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.