OMI Research Newsletter – October 2026

The Oxford-Man Institute of Quantitative Finance (OMI) is a world-leading centre for interdisciplinary research in financial markets. The OMI addresses fundamental problems in quantitative finance with a strong focus on machine learning and data-driven models.

*The **OMI Research Newsletter** is a curated summary that covers the most recent research, insights, and tools related to financial decision-making.*

Highlights

Key contributions in this month's edition include the following. Renò and Shi (2026) decompose asset returns, disentangle drift from leverage, and show how continuous price movements propagate trends while jumps partly reverse them. Bennedsen et al. (2026) capture volatility roughness by adding an MA(1) component to AR and HAR models, improving forecasts with a simple discrete-time specification. Cartea et al. (2026) survey how AI transforms financial information production, weighing potential efficiency gains against effects on competition, informational frictions, and stability. Ding and Shi (2026) identify a common trading intensity factor whose negatively dependent short-horizon movements and transitory price effects reveal systematic intraday liquidity frictions. Patton (2026) establishes that minimum-variance portfolio performance defines a weakly consistent score for covariance forecasts, with rankings sensitive to portfolio constraints. Della Corte et al. (2026) find that short-selling bans worsen liquidity but can limit large drawdowns, with their effectiveness depending on the composition of stock ownership. Park and Malinova (2026) derive conditions under which a multi-currency liquidity pool lowers aggregate trading costs relative to dollar routing, highlighting the roles of return correlations and cross-currency flows. Barras, Phutphithak and Scaillet (2026) show that family scale reduces fund skill but improves scalability for most funds, while families grow beyond the size that maximises investment value creation. Jarociński and Karadi (2026) separate monetary-policy, central-bank-information, and response-to-news shocks, showing that removing both information-related components strengthens estimated policy effects. Itkin and Sánchez-Betancourt (2026) characterise option replication when hedging changes the payoff through price impact, establishing exact replication under specified payoff and execution-cost conditions.

Econometrics, Statistics & Machine Learning

An Anatomy of Asset Returns

R. RENÒ, S. SHI
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The authors use realised autocovariances of power-transformed semi-returns to distinguish continuous price movements from jumps and disentangle drift from leverage at second order. The decomposition reveals offsetting sources of return predictability that are obscured in aggregate returns. Continuous movements transmit overnight returns into the trading day, whereas jumps partially reverse them. A similar pattern appears during crises and booms: persistent continuous movements are partly counteracted by discontinuous adjustments. The findings connect overnight momentum and reversal to a broader mechanism in which continuous price changes propagate trends while jumps temper them.

The "Rough" HAR Model

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A first-order moving-average component offers a simple way to incorporate roughness into familiar autoregressive and heterogeneous autoregressive volatility models. For Hurst parameters below one half, the leading lag dominates the Wold expansion of fractional Gaussian noise. An MA(1) extension approximates this dependence, with its coefficient mapping almost linearly to the Hurst parameter. For log realised variance of ten ETFs, estimated

MA coefficients are consistently negative. The resulting "rough" AR and HAR models generally improve out-of-sample forecasts, particularly at short horizons, while approaching the accuracy of continuous-time rough models with simpler estimation.

Glivenko–Cantelli Theorems for Integrated Volatility Functionals in Pure-Jump Semimartingales with an Application to Cryptocurrency Markets

D. Chen, J. Li, T. Xie, C. Yan
Singapore Management University

This paper develops uniform consistency results for integrated volatility functionals when prices follow a pure-jump semimartingale in a stable, heavy-tailed setting. Local estimators based on absolute powers of high-frequency increments are aggregated into an empirical occupation measure of latent volatility. Maximal inequalities replace arguments based on local Gaussianity, yielding Glivenko–Cantelli results for several classes of test functions. These support estimation of volatility occupation times and quantiles, as well as consistency of associated M-estimators. A stability-based rule selects the power index, and simulations and a cryptocurrency application illustrate the approach in a jump-dominated environment.

Martingale Central Limit Theorems in p-Wasserstein Distance

X. Fang, Y. Koike, Z.-Y. Su
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The authors derive multivariate martingale central limit bounds in p-Wasserstein distance for $p \geq 1$, with transportation costs measured using any ℓ_r norm, $r \in [1, \infty]$. The results extend existing bounds focused on $p = 1$ and the Euclidean norm. The proof combines Lindeberg's replacement argument with a new Gaussian convolution inequality that compares a perturbed Gaussian distribution with a Gaussian having matching moments. Consequences include Yurinskii-type couplings and Cramér-type moderate deviations. An application to Polyak–Ruppert averaged stochastic gradient descent illustrates how the results bound Gaussian approximation errors in stochastic optimisation.

Finance and Economics

Artificial Intelligence and Financial Markets

Á. Cartea, J.-E. Colliard, T. Foucault, P. Hoffmann, R. Graumans, J.-D. Sigaux
University of Oxford, HEC Paris, European Central Bank, Autoriteit Financiële Markten

This survey examines AI as a technological change in how financial institutions transform data into information and decisions. It reviews implications for labour demand, intermediation, price efficiency, competition, agency conflicts, and financial stability. Better prediction may improve capital allocation, while economies of scale in data and computing can favour large intermediaries. The authors also discuss algorithmic collusion, information asymmetries, and risks from correlated trading strategies. These effects need not move together: incentives to seek distinctive information can counteract common-model risks. Evidence on proprietary trading firms illustrates why the consequences for competition and stability remain empirically contingent.

A Fine Lens on Common Trading Flows

Y. Ding, S. Shi
University of Macau

The paper studies common trading activity at very high frequencies through a continuous-time, high-dimensional factor model of stock trading volume. Its common trading intensity factor summarises shared trading flows, and new estimation and inference methods reveal the factor's short-horizon dynamics. U.S. equity data show pronounced negative serial dependence in changes in common trading intensity, consistent with systematic intraday liquidity frictions. Large negative intensity shocks are followed by short-lived price adjustments that quickly unwind. Together, these findings suggest that common liquidity imbalances affect prices briefly and that intraday rebalancing restores liquidity rapidly.

Minimum Variance Portfolios as Consistent Scoring Functions

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Comparing the realised variances of minimum-variance portfolios is a popular way to evaluate covariance forecasts. This paper characterises the implied scoring function as homogeneous and a member of the Bregman family. Expected forecast rankings are unchanged when the latent covariance is replaced by a conditionally unbiased proxy. Its consistency is only weak, however, because many distinct covariance forecasts can produce identical losses. The results extend to constrained portfolio problems, including short-sale restrictions and maximum-Sharpe-ratio portfolios. Constraints shape the loss function and can alter the ranking of misspecified forecasts. Portfolio performance therefore provides a valid evaluation criterion without necessarily distinguishing all aspects of covariance forecast accuracy.

The Double-Edged Sword of Short-Selling Bans

P. Della Corte, R. Kosowski, D. Papadimitriou, N. P. Rapanos

Imperial College London, King's College London, University of Cyprus, Oxford-Man Institute of Quantitative Finance, CEPR

The authors model a regulator's decision to prohibit short selling when seeking to prevent sharp stock-price falls. Evidence from European restrictions introduced in 2020 supports a trade-off: bans worsen liquidity and do not raise average price levels, yet can limit large drawdowns. The composition of stock ownership helps explain these effects. Liquidity costs are greater when informed investors represent a larger share of stockholders, whereas protection against extreme declines is stronger when that share is smaller. Institutional ownership provides an empirical proxy for informedness, suggesting that the costs and benefits of intervention vary systematically across stocks.

Dethroning the Dollar? Optimal Multi-Asset Market Making

A. Park, K. Malinova

University of Toronto, McMaster University

Routing foreign-exchange trades through the dollar concentrates liquidity but requires cross-currency traders to pay costs on two legs. The authors examine whether a single multi-currency liquidity pool can reduce aggregate costs by optimally choosing capital weights and pair-specific fees. They derive a condition linking the pool's advantage to return correlations and cross-currency trading flows. Capital weights determine aggregate costs and price impact, while fee allocation determines how traders share those costs. A pool that outperforms dollar routing in aggregate need not withstand entry by a specialised dollar market. The framework also applies to assets sharing another settlement asset.

The Common Source of Option Return Anomalies

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Many characteristic-based anomalies in delta-hedged equity option returns reflect exposure to a common monthly repricing around standard contract expiration. Implied volatility explains about four fifths of average long–short anomaly returns and nearly all of those returns on the two rollover days. Controlling for volatility also reverses the direction of the idiosyncratic-volatility and maximum-return anomalies. For contracts that remain outstanding, the extra loss around expiration weekends comes from an absent recovery in implied volatility, rather than ordinary time decay or realised variance. This effect increases with volatility and rolling open interest, connecting apparently separate anomalies to predictable exposure to the same recurring event.

From Funds to Families: Organizational Scale in Value Creation

L. Barras, P.-A. Phutphithak, O. Scaillet

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Mutual-fund families affect both the quality of investment ideas and the amount of capital that affiliated funds can deploy profitably. The authors find that larger families reduce fund skill but improve scalability for most funds. The latter effect dominates on average, helping funds maintain positive value added at substantial asset levels. Nevertheless, a normative analysis finds that families operate well beyond the size that would maximise investment value creation. Fee revenues remain close to their optimum despite this excess capacity. The results distinguish the benefits of organisational scale from incentives to accumulate assets and collect fees.

Does AI Assistance Enhance or Erode Expertise? Evidence from a Three-Month Field Experiment in Patent Drafting

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A preregistered, three-month randomised trial assigned 133 patent lawyers at eleven U.S. firms to AI-assisted drafting or a no-AI control group. Blinded expert assessments show that assistance improved drafting quality after both ten and ninety days, with larger immediate gains for junior lawyers. When participants subsequently edited a patent application without AI, the treated group performed better, but the average improvement was concentrated among senior lawyers. Junior lawyers showed no average gain and more dispersed outcomes. The findings distinguish better performance while using AI from durable learning, suggesting that existing expertise may help professionals convert AI-assisted practice into independent judgment.

Monetary Policy Surprises with Imperfect Information

M. Jarociński, P. Karadi

European Central Bank, CEPR

Interest-rate surprises around Federal Reserve announce-

ments combine genuine policy shocks with information about the economic outlook and surprises about the Fed's systematic response to public news. The authors jointly identify these three components using interest-rate and equity co-movements, predictability from public information, and heteroskedasticity across FOMC and other communications. Central-bank information effects remain important at daily and monthly frequencies, whereas response-to-news effects matter principally at the daily frequency. Removing both components strengthens estimated monetary-policy effects. The results reconcile two explanations of contaminated high-frequency policy instruments and clarify why they require distinct identification restrictions.

The Capacity Cost of Informational Screening

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An informed advisor seeks to coordinate voluntary resource use under a fixed capacity limit, while individuals hold private beliefs and may disregard recommendations. In the model's feasible coordination environments, eliciting those beliefs necessarily induces some harmful use. Policies that maximise welfare or minimise harm also sacrifice beneficial uses that direct allocation could achieve. If beliefs are observed instead, advice can attain the direct-allocation benchmark without harmful use. The paper characterises incentive and capacity restrictions and uses antibiotic stewardship as motivation. Its central result isolates a cost of screening private beliefs when the advisor cannot directly control access or compel compliance.

Mathematical and Computational Finance

When Hedging Changes the Payoff: Option Replication with Price Impact and Execution Costs

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When a hedger moves the underlying price, the hedge also changes the derivative payoff it must replicate. This paper models that feedback while accounting for execution costs and distinguishing maturity from subsequent cash settlement. Replication is characterised by a fixed-point equation in a binomial model and a nonlinear pricing PDE with an implicit terminal condition in continuous time. For monotone, convex, Lipschitz payoffs, including calls and puts, exact replication is established under midpoint execution costs. Numerical examples show effective strike shifts, nonlinear contract-size effects, and situations in which the hedger's own trades move an otherwise worthless option into the money.

Concentrated Liquidity Provision: A Reinforcement Learning Perspective

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Liquidity providers in concentrated-liquidity automated markets must choose both when to rebalance and which price ranges to support. The authors formulate this decision as a stochastic impulse-control problem and approximate its solution using reinforcement learning. Learned policies adjust position width, asymmetry, and rebalancing frequency to mispricing, transaction costs, uncertainty, inventory, and risk preferences. Narrow positions generate more fees but require more active management and can incur greater losses and gas costs. Simulations against benchmark strategies show how state-dependent policies can reduce severe downside outcomes, providing an interpretable computational approach to liquidity provision in a high-dimensional setting.

SAiFE-gym: Model-Based Environments for Automated Market Making with Concentrated Liquidity

G. Chionas, C. Kleitsikas, S. Leonardos, L. Sánchez-Betancourt, C. Ventre

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SAiFE-gym provides modular Python simulation environments for studying automated market making with concentrated liquidity. Its components represent price dynamics, order flow, liquidity allocation, price impact, and blockchain frictions, allowing researchers to assemble different economic settings. Vectorised simulation supports parallel trajectories and scalable reinforcement-learning experiments, with integration into standard learning software. The authors demonstrate the environments by training and evaluating liquidity-provision agents under uncertain market parameters, including through domain randomisation. The contribution is a reusable experimental framework for comparing dynamic trading policies and investigating how market assumptions affect their performance.

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