



Intraday correlation trading

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Intraday correlation



➤ Derivative trading books

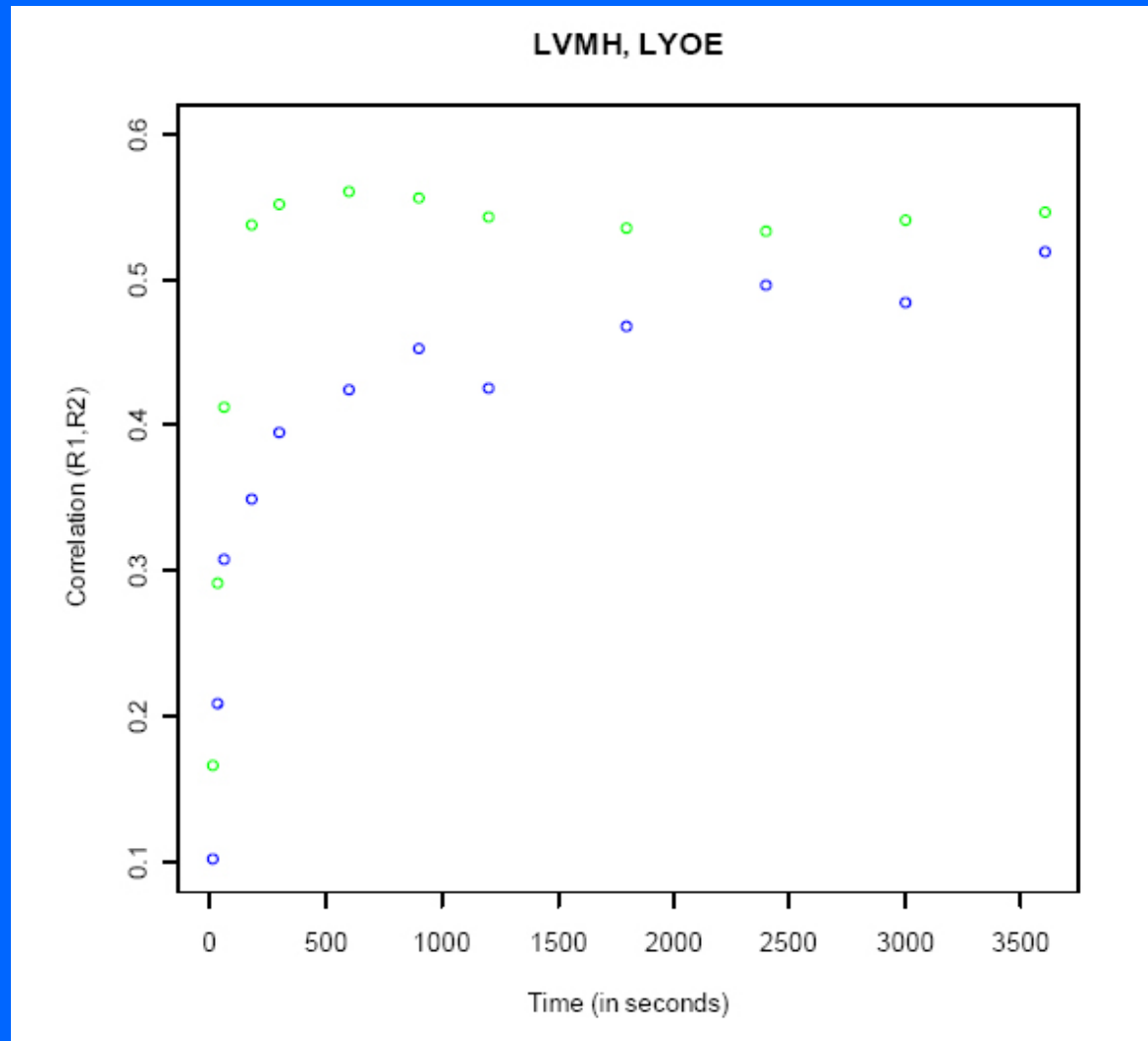
- Huge portfolios
- Daily asset re-allocation
- Sensitivity to
 - Models
 - Hedging frequency
 - Realized covariance

Intraday correlation



➤ Realized correlation

- Depends on the definition of time
 - Physical time...
 - ... or event time ?
- And the time scale
 - Epps effect
 - Lead-lag relationships



Intraday correlation



➤ P&L from trading $\Delta(P \& L) = \Delta_1(P \& L) + \Delta_2(P \& L)$

- A function of
 - The trading frequency

$$\Delta_1(P \& L) = - \sum_{k=0}^{N-1} \int_{t_k}^{t_{k+1}} (\delta_t^i - \delta_{t_k}^i) dS_t^k$$

- The uncertainty on realized covariance

$$\Delta_2(P \& L) = - \frac{1}{2} \int_0^T \sum_{i,j} \frac{\partial^2 V}{\partial S_i \partial S_j} \left(d \langle S^i, S^j \rangle_t - S_t^i S_t^j \rho_{ij} \sigma_i \sigma_j dt \right)$$

Intraday correlation



➤ Both are sensitive to the « gammas »

- Obvious for $\Delta_2(P \& L)$
- Itô-Taylor expansion $\Delta_1(P \& L)$

➤ The target in trading: to control (optimize) both

- Covariance modelling
- Suitable trading strategies

Intraday correlation



- Dynamic derivatives portfolio trading
 - Multi-asset best execution
 - Stochastic covariance modelling
 - Hedging frequency
 - Event vs physical time
 - Decorrelation at short to intermediate time scales