



CAPITAL FUND MANAGEMENT

## Financial infrastructure and resilience of the financial system

Charles-Albert LEHALLE – September 2013

# Raising questions on market microstructure?

2010-Jan - SEC Issues Concept Release Seeking Comment on Structure of Equity Markets

2010-May – The Flash Crash

2010-November – LSE glitch

2011-June – Chi-X Europe glitch

2011-July – Four glitches in a month for Euronext

2011-November – Australian Stock Exchange glitch

2011-December – Chi-X Australia glitch

2012-March – BATS IPO glitch

2012-June – Euronext glitch

2012-Aug – Knightmare on wall street

2013-April – The Hash Crash

2013-Aug – Goldman Sachs marker-making outage

2013-Aug – China: the Everbright “fat finger”

2013-Sept – NASDAQ SIP glitch

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Web links at <https://delicious.com/lehalle/outage>



# Why should we bother?

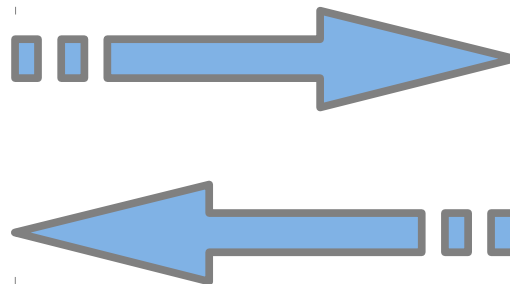
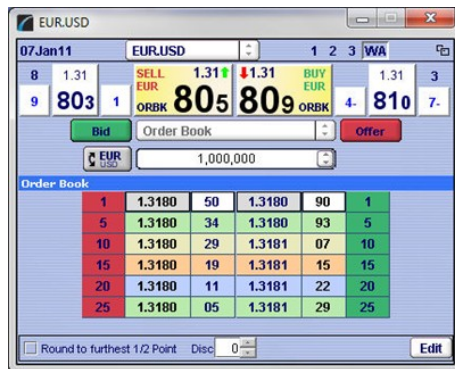
The dynamics of the Price Formation (or Price Discovery) Process is twofold:

## A forward dynamics

The balance between offer and demand at  $t$  move prices at  $t+\epsilon$

## A backward dynamics

The comparison between current prices and future expectations triggers new offers and demands



1 EUR = 1.3303 USD -0.00070 (-0.053%)

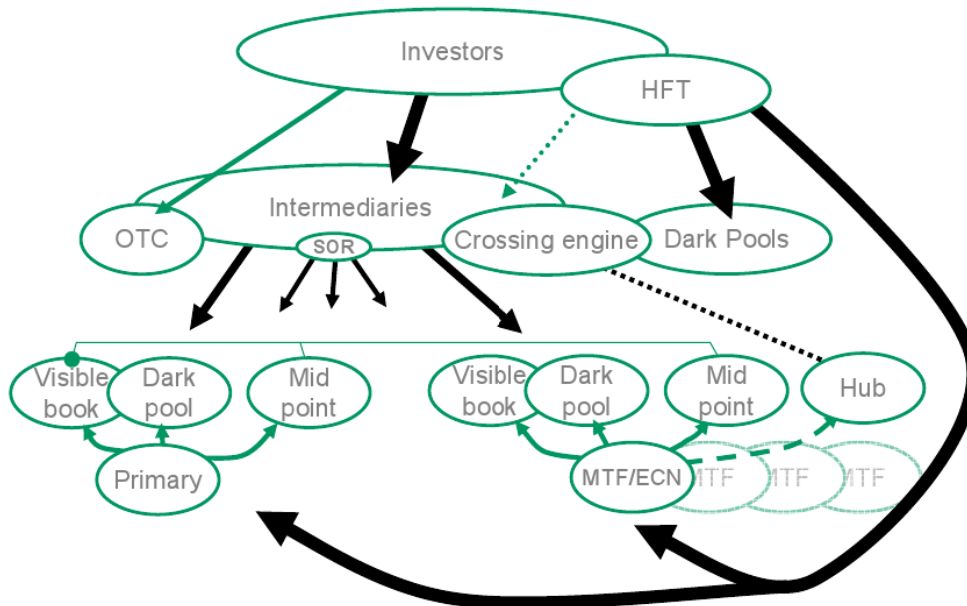
Sep 12, 9:00AM GMT



It simultaneously creates (endogenous) information and conveys (exogenous) information. Having a sound PFP is crucial.

# Recent changes

Regulatory changes (MiFID + Reg NMS) and post-crisis liquidity attrition reshaped the market design, now we have:

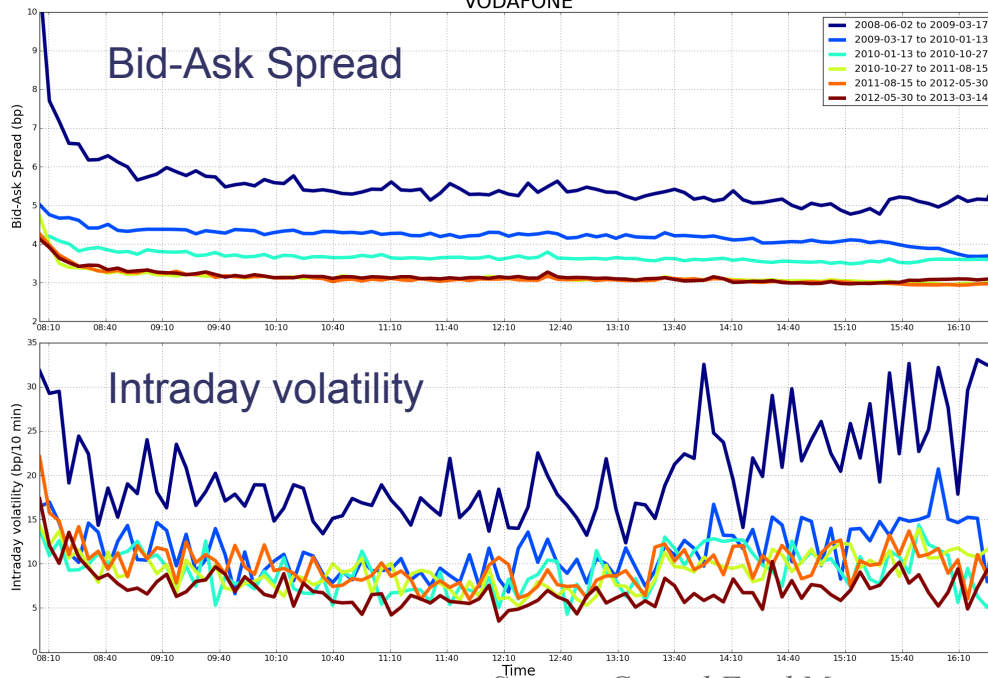


- a distributed network of trading pools,
- connected together by heterogeneous protocols (and different regulators).
- Plus “liquidity bridges” operated by a new kind of middlemen turning rapidly a small inventory between pools.

# The story of European fragmentation in one slide

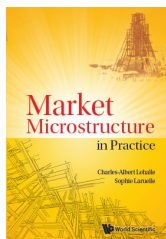
The Bid-Ask spread is the price difference between the best offer and the best demand. It is an important component of the trading costs (it is part the price to pay for immediacy, the other part is the “market impact”).

VODAFONE



Source: Capital Fund Management

- From the blue (2008) to the red curve (2013): the BA-spread decreased,
  - with more emphasis at the end of the day;
  - it is significant of HFT practices (reducing their overnight inventory).
- => less cost, less systemic risk, but more operational risk?



For the full story in 280 pages, see “[\*Market Microstructure in Practice\*](#)”...



# Understanding recent issues

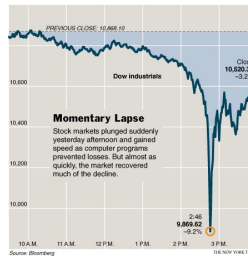
## Emergence

Hash Crash

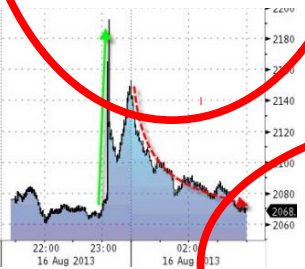
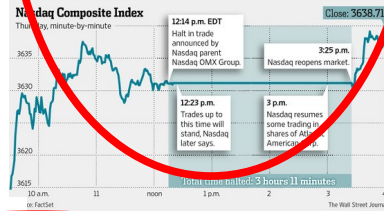


Misleading information

Flash Crash



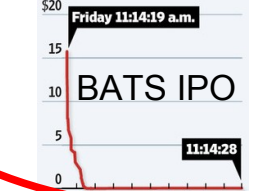
NASDAQ-SIP



Chinese Everbright

Knights

Goldman Sachs



Technology

Operational risk

European outages

3 kind of issues

- Operational Risk
- Misleading information
- Emergence; collective runaway

# What can be done?

- Standards and norms

*End-to-end standards for electronic markets, a norm for the development of matching engines, a certification for the dev. of automated trading systems...*



- Operational Risk

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- Education

*Improve investors' knowledge on market microstructure, simplification of market design (tick sizes, liquidity segments, circuit breakers, etc)...*



- Misleading information

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- Multiple means

*Improvement of the market maker status, circuit breakers, end-to-end testing sessions...*



- Emergence; collective runaway

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