The Impact of Computer Based Trading on Systemic Risk
(the Foresight Report)

by

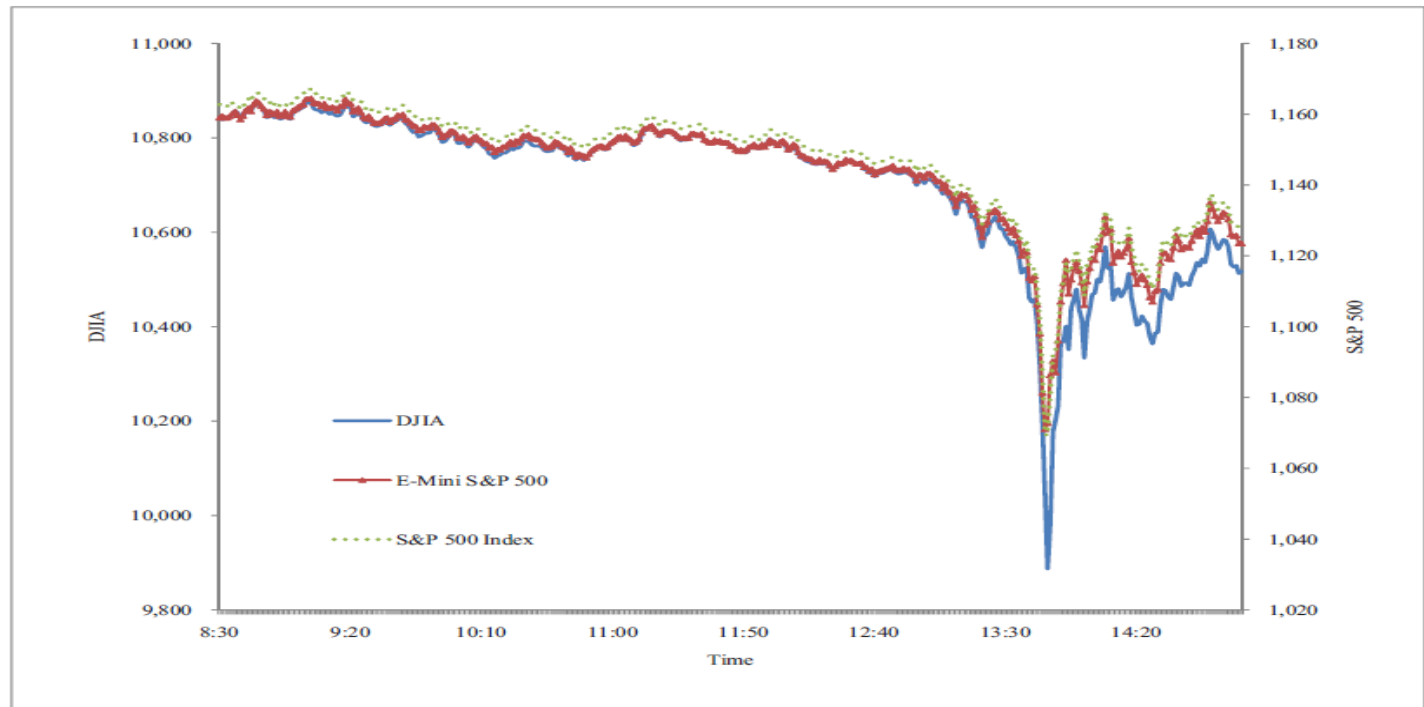**Jean-Pierre Zigrand**

Discussion by

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The Future of Computer Trading in Financial Markets

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Issue

- Do HFT and CBT increase financial instability and systemic risk in financial markets?

- Example: the flash crash, May 6, 2010

- Role of HFT (see e.g. Kirilenko (2011)): not causing it but maybe deepening the volatility

- Many other instances of important swings in asset prices

Key findings and some first thoughts

- No evidence that HFT increases volatility – not necessarily a good indicator of financial instability

- HFT, within their management and control processes, however may lead to strengthened "non-linearities" through reinforcing feedback loops
  - Triggers: changes in market volumes, market news, delays in distributing reference data

- "normalisation of deviance": risky events become to be seen as normal
  - However, rational expectations equilibria require price jumps
  - "equilibrium" with and without CBT: volatility in a "without CBT environment" may be underestimated?

Possible impacts of CBT on financial stability

- Computer based trading: "trading where computer algorithms directly interface with trading platforms and placing orders *without **immediate human** intervention*"

- Upside CBT or HFT compared to human traders:
  - Human traders may be subject to irrational behavior <-> CBT should in principle not be (unless the rules written by humans also exhibit it)
  - May be self-correcting?

- Downside of CBT:
  - Concentration risk: similar underlying rules and therefore overreactions take place. May lead to feedback loops
  - Heterogeneity in HFTs strategies? How stable over time and in the cross-section?

Possible impacts of CBT on financial stability

- Mechanisms:
  - Risk drivers
    - Sensitivity to small changes is larger: "equilibrium" with and without CBT may be different
    - Information:
      - if HFTs are faster in interpreting information this should be good for price discovery and efficiency of markets <-> participation of non-HFT traders may be crowded out and information collection may go down
      - Social optimal number of HFTs may be different from privately optimal number of HFTs
    - Endogenous risk: Risk feedback loop, Volume feedback loop, Shallowness feedback loop, Order book imbalance feedback loop, news feedback loop, delay feedback loop
      - Should heavily invest in having an EBBO that adjusts for possible delays
      - Harmonize delays and speeds of platforms?
  - Normalisation of deviance: reduced by circuit breakers
    - Circuit breakers may reduce this but also be an additional trigger when anticipating circuit breaker interruption (see Draus and Van Achter (2012))
    - Circuit breakers in a fragmented market: harmonization of circuit breakers seems required

Empirical studies of impact HFT on stability

- Do not seem to find that HFT contributes to instability
  - E.g., Jovanovic and Menkveld (2011) find a volatility reduction stemming from the entry of one HFT doing a careful diff-in-diff analysis
  - Impact of "market share of HFTs" and "business model of HFTs"?

Possible impacts of CBT on financial stability

- Impact of mechanisms stemming from HFTs may be larger when
  - HFTs have little capital
  - Algorithmic crowding
  - Rumours and beliefs may lead to particular cascades

- Impact of HFTs on consolidated liquidity: issue of "ghost liquidity"
  - Market fragmentation seems to have improved consolidated liquidity (see e.g. Degryse, de Jong and van Kervel (2012)
    - Applies for SORT traders (e.g., aggressive HFT traders)
    - Liquidity available for non-SORT traders may be heavily overestimated as HFTs anticipate they can withdraw liquidity faster than "other traders" (see e.g., van Kervel (2012))

Similarities with banking literature

- Many similarities with banking literature
  - Banks employed VaR models for their risk management systems
  - VaR systems often written by one or two players and the common adoptions induce systemic risk (Basak and Shapiro (RFS2001))
  - If HFTs have many commonalities, then may also induce systemic risk
- Regulation and supervision of banks
  - Micro-prudential regulation <-> macro-prudential regulation and supervision since crisis
  - HFTs: should supervisors understand strategies and prevent commonalities?
    - Externalities within financial markets may be lower compared to banks but externalities from markets to banks may call for understanding of HFT business models
    - Impose liquidity requirements? Capital requirements? Entry requirements?

Some concluding remarks

- Current evidence suggests HFTs do not increase financial instability

- Longer term: many unanswered questions remain
  - Do HFTs crowd out other investors?
  - Do they crowd out other market makers that commit capital?
  - Competition between HFTs encourages stability or induces more risk taking?
  - What if HFT goes bankrupt? Who picks up the bill?