

The Accountability Problem in Algorithmic Markets

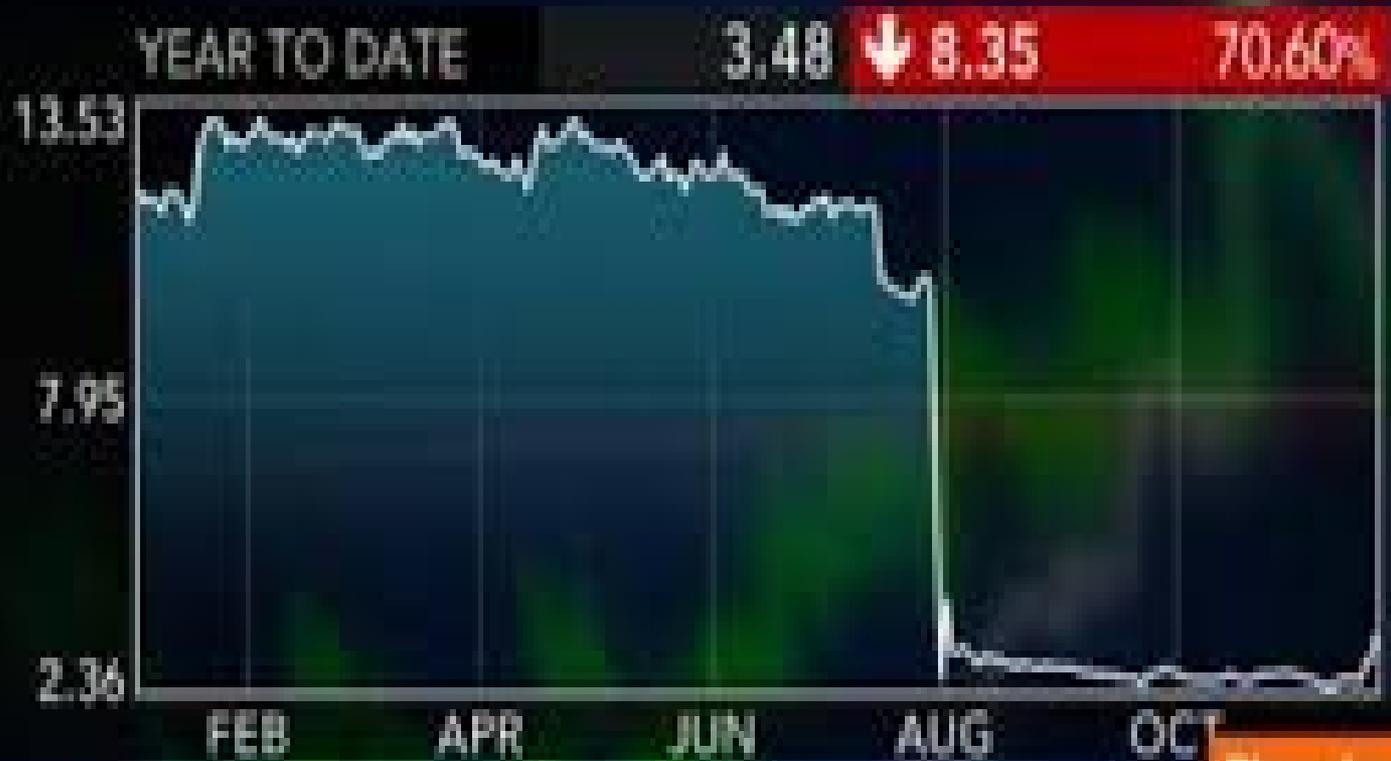
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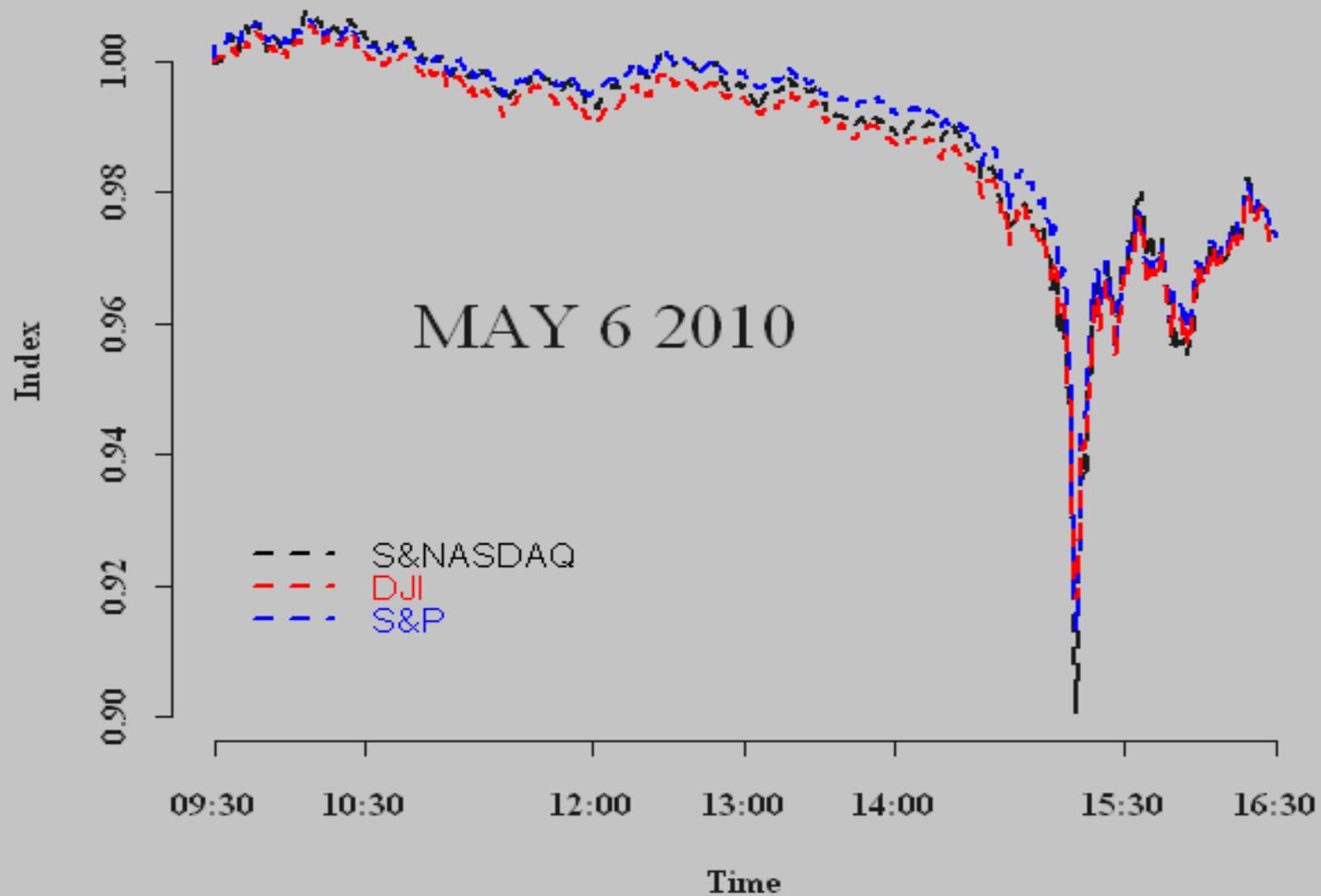
Feb. 14, 2018

Knight Capital Group



Bloomberg

Flash Crash



1. GOOG - Showing trades color coded by exchange.



Source: Nanex

Key Question

- How do we prevent accidents and disruptions in the algorithmic markets?
- We make traders responsible by: (i) holding them responsible for their bad behavior; and (ii) making traders pay for harmful.
- An ineffective allocation of responsibility can fail to constrain risk-taking and create costs for investors as well as for market stability.
- From the policy standpoint, capital allocation can be impacted where investors are forced to discount for the risk of failure.

Algorithms in Securities Markets

- The way we trade securities has undergone significant transformation in the last decade.
- Rather than relying on human beings to send orders, match and settle trades, these tasks are delegated to algorithms.
- Pre-set computerized instructions now perform key tasks that were once performed by human beings.
- Algorithmic trading is responsible for around 50-70% of equity volume, 60% in futures markets and 50%+ in U.S. Treasury markets.

Interconnection

- Automated traders - and the infrastructure underpinning trading - harden and deepen interconnection between markets.
- Regulation creates a National Market of 13 exchanges that allows investors to buy securities at the best price anywhere.
- Traders create strong informational and transactional linkages between the equities and derivatives markets.
- Finance studies report that markets are now increasingly efficient and prices converge quickly across the marketplace.

Argument

- The current liability framework appears unable to either constrain or punish in automated markets.
- Regulation benchmarks compliance by key liability standards: (i) negligence; (ii) strict liability; and (iii) intent-based fraud.
- But liability constraints function weakly in a market underpinned by pre-programmed algorithms. Error is endemic to their operation.
- Compensation may be ineffective where small errors result result in large costs owing to interconnections in algorithmic markets.

Strict Liability

- Securities regulation usually relies on strict liability for more low-level, technical breaches.
- However, strict liability can be problematic as a workable standard in automated markets.
- As noted, error is endemic to the operation of complex algorithms. Strict liability may fail to properly constrain bad acts.
- The effects of error may also be uncertain. The costs of taking sufficient care to satisfy strict liability can be prohibitive.

Negligence

- The negligence standard acts to punish unreasonable risk-taking. This means that some reasonable risk-taking can be acceptable.
- It may be rational for a trader to take reasonable risks (or even some unreasonable risks) to the extent that she will not be liable.
- But, even reasonable risk-taking can be costly in the context of interconnected algorithmic markets.
- The full extent of the harms can be uncertain to predict at the outset (e.g. Knight Capital).

Intent

- Traditionally, intent-based liability for manipulation and fraud has been notoriously difficult to establish.
- AT may, in fact, make the task easier. Regulators can rely on data. Traders leave a transaction trail. This is a huge improvement.
- However, there are still some challenges. For one, data is not easy to interpret. Secondly, regulators may focus on those areas where the data collection and interpretation costs are low.
- This may push regulators to focus on more self-evident types of deception like fairly clear spoofing activity.

Thank you!

Papers:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2754786

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2652893