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### What caused the flash crash? **One big, bad trade**

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MONEYMEN have yet another fat document from regulators to chew over. On Friday October 1st, America's Securities and Exchange Commission and its Commodity Futures Trading Commission issued a [joint report on the “flash crash” of May 6th](http://www.sec.gov/news/studies/2010/marketevents-report.pdf) (<http://www.sec.gov/news/studies/2010/marketevents-report.pdf>) . That afternoon, American share and futures indices went into a

seemingly inexplicable tailspin, falling 10% in a matter of minutes, with some blue-chip shares briefly trading at a penny, only to recover most of the lost ground before the end of the trading day. The short-lived plunge raised awkward questions about whether trading rules had failed to keep up with markets that now handle orders in milliseconds.

Weighing in at more than 100 pages, the report provides a thorough account of what happened that day, based on masses of data pulled from trading firms and exchanges. In the hours before the nosedive, volatility was unusually high and liquidity thin, thanks to a barrage of unsettling political and economic news. The main trigger for the sudden decline, the report suggests, was a large sell order in “e-mini” futures on the S&P 500 index by an unnamed mutual-fund group (reportedly Waddell & Reed (<http://www.reuters.com/article/idUSTRE69040W20101001>)).

Because this automated “algorithmic” trade was programmed to take account of trading volume, not price or time, it was executed unusually rapidly: in 20 minutes, instead of the several hours that would be typical for such an order.

This is where high-frequency trading firms (HFTs) enter the story. These outfits zip in and out of shares, often holding them for less than a second. This fickleness has attracted criticism, with some accusing them of undermining market stability. HFTs initially helped to absorb the sell pressure, buying e-mini contracts. Ten minutes later, however, they began forcefully selling to reduce their “long” positions. The sell algorithm used by the mutual fund responded to this increased volume by increasing the rate at which it fed orders into the market, creating a negative feedback loop.

## **Two liquidity crises**

This created two separate liquidity crises, the report says: one at the broad index level in the e-mini, the other in individual shares. HFTs began quickly buying and reselling to each other e-mini contracts. This “hot potato” trading generated lots of volume but little net buying.

Traditional buyers were unable or unwilling to step in, and the depth of the buying market for e-minis and S&P 500-tracking exchange-traded funds fell to a mere 1% of its level that morning.

The second liquidity crunch, in individual stocks, began when automated trading systems used by market-makers and other large liquidity providers paused, as they were designed to do when prices move beyond certain thresholds. This left traders to assess the risks of restarting trading. A number of participants reported that because prices had fallen precipitously across many types of securities, they “feared the occurrence of a cataclysmic event of which they were not yet aware, and that their strategies were not designed to handle,” says the report.

Some market-makers reacted to this increased risk by widening the spreads between the levels at which they would buy or sell. Others withdrew completely. Some resorted to manual trading but could not keep up with the explosion in volume. It did not help that market-makers in over-the-counter markets (those that trade off public exchanges) began routing their orders to the exchanges, where they competed with other orders for immediately available but dwindling liquidity. HFTs—whose rapid-fire trading has been blamed by some for the collapse in liquidity—were net sellers at this time, but so were most other participants. Some HFTs continued to trade throughout the crash, even as others reduced or halted trading.

### **The lessons are complex**

The regulators point to a number of lessons that need to be learned. In times of turmoil, automated orders can trigger extreme price swings, especially if the algorithm does not take account of prices. And the way in which these automatic orders interact with high-frequency and other computer trading strategies can quickly erode liquidity, even amid very high trading volume. More work also needs to be done to understand how stockmarkets and derivatives markets interact, especially with respect to index products.

Another lesson is that official trading pauses can be a good way to provide time for sanity to return to markets, but unco-ordinated breaks can do more harm than good. On May 6th the New York Stock Exchange stopped trading briefly while other exchanges and alternative trading venues kept going. This led to a diversion of order flows that greatly added to the pressure on those markets. The SEC has since introduced “circuit-breakers” for individual shares that halt trading across all markets. These may be modified to allow shares to continue trading, but only within pre-set bands. The commission has also brought in uniform policies for cancelling trades struck at clearly irrational prices. And it is eliminating “stub quotes”, which thanks to a technical oversight allow market-makers to buy perfectly good stocks for a penny if there are no other bids.

Another area that needs to be looked at is market data. Though the report does not see data delays as a primary cause of the crash, differences in data conventions among the dozens of markets may have exacerbated it.

Some will no doubt see the report as confirmation that high-frequency trading is dangerous stuff. In response, the robo-trading crowd will point out that the algorithm at the centre of the story was executed not by one of them, but by a bog-standard mutual fund. As the blame game continues, the real question will be whether the report, and the measures taken to avoid a repeat, help to restore confidence in today's market structure.

Read on: [Cleaning up the mess after Lehman's collapse will take years more of work \(http://www.economist.com/node/16994720\)](http://www.economist.com/node/16994720)

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