



Gone in 60 Seconds

The underlying cause of the flash crash? A fragmented market structure

BY DENNIS DICK, CFA

In the “flash crash” of 6 May 2010, the DJIA fell more than 500 points in only a few minutes but then quickly recovered all of those losses. “Fat fingers,” computer glitches, and high-frequency trading have shouldered most of the blame. In reality, although a number of contributing factors led to the sudden market plunge, the crash was primarily a result of a fragmented market structure.

Before the turn of the century, NYSE-listed stocks traded primarily on one exchange, the NYSE. Today, dozens of public exchanges make markets on NYSE issues. Some of these trading centers are displayed while others are not. But they all have one thing in common—their prices are derived (for the most part) from the quotations of the primary exchange, which is typically the NYSE.

The NYSE has a type of volatility-control system called the LRP (liquidity replenishment point). Each stock has its own individual LRP, which automatically adjusts every few seconds as the price of the security moves. This LRP price is typically a few percentage points away from the current price of the stock. If a stock moves too quickly in any given direction, the LRP will be reached and the NYSE market for that security will convert from an automated market to a manual auction market. This switch allows the designated market maker on that security to step in and manually trade the order flow. The purpose is to avoid sudden market collapses and curb excessive volatility.

What happened on 6 May? The market was trending down for a good part of the afternoon. When the S&P 500 Index fell below the 1,100 level,

there was increased selling pressure, which caused the LRPs to be reached on a number of NYSE issues. Trading went to a manual auction market on these issues, effectively halting NYSE trading on them for a few seconds while the designated market makers manually handled the order flow.

But with the NYSE in a slow market because the LRP was reached, market participants sending orders via smart-order routers had their orders routed to other trading centers (because the smart-order router seeks out the best available liquidity). Some of these other trading centers are very thin—there isn’t much liquidity on their order books. Thus, it doesn’t take much selling pressure to have a significant move in price.

In the case of Proctor & Gamble, the stock reached its LRP at US\$59.41 and then went to a slow market, causing the NYSE price to halt temporarily until the designated market maker on the NYSE could manually fill the sell orders coming into the system. The stock continued to trade on the other exchanges, sweeping the other exchange books down as low as US\$39.37. A couple minutes later, the NYSE reopened the stock at US\$56, and the stock quickly recovered to US\$60. The quick recovery was little consolation for those investors who had their stop-loss orders executed below US\$50.

Some critics blamed the NYSE circuit breaker for the plunge because market participants seeking liquidity could not access the NYSE liquidity when it switched to a slow market. But the LRP system of the NYSE wasn’t to blame. In fact, anyone selling the stock on the NYSE got a price no worse than US\$56. The flaw was that the other exchanges didn’t have similar systems in place. When the

KEY POINTS

- Dozens of public exchanges (with displayed and undisplayed liquidity) make markets on NYSE issues, but they all have one thing in common—their prices are derived (for the most part) from the quotations of the primary exchange.
- Some critics have blamed the NYSE “liquidity replenishment point” circuit breaker for causing the so-called flash crash on 6 May, but the real flaw was that the other exchanges didn’t have similar systems in place.
- High-frequency trading and internalization practices are also implicated in the flash crash. Unlike traditional market makers, high-frequency trading firms have no affirmative obligations to make markets in turbulent times.
- The SEC’s concept of a “trade-at” rule, which would give priority to the displayed NBBO (National Best Bid and Offer), is a possible solution that would encourage market-making participants to display bids and offers more aggressively.

NYSE went to a slow market, the other exchanges ought to have had similar circuit breakers. Otherwise, when the primary exchange, the NYSE, is not trading, trades are executed on other exchanges at prices well below the current price on the NYSE. The smart routers simply sweep out the thinner ECN (electronic communication network) limit books.

To address this problem, the exchanges began a pilot program in June on uniform circuit breakers for the S&P 500. Any stock that moves more than 10 percent in a five-minute period will temporarily halt for five minutes on all exchanges. The pause not only will give market participants an opportunity to react to the sudden move in the affected security but will give the security time to attract new trading interest. After five minutes, the security will resume trading in a fair and orderly fashion.

Since the pilot program began in mid-June, circuit breakers have been activated in only a couple of incidents. Trading was temporarily halted for

the *Washington Post* and Citigroup as a result of the circuit breakers.

“In general the pilot seems to have worked well,” said Joseph Mecane, executive vice president at NYSE Euronext. “The fact that there haven’t been a lot of circuit breakers triggered and there hasn’t been another May 6 are positive signs. The few triggers that did happen highlighted some existing issues with erroneous trades that are being addressed through separate initiatives, but we don’t view that as being a problem with the circuit breakers themselves.”

These circuit breakers may prevent future flash crashes. According to Mecane, “The hope is that temporary, extreme price moves would not happen and stocks would be brought back in line after a brief auction.”

The lack of uniform circuit breakers may explain the reason why NYSE issues collapsed, but unfortunately, it does little to explain why issues listed on the NASDAQ collapsed. The NASDAQ does not have a similar LRP system. For example, Apple computer fell more than 50 points during the flash crash and quickly recovered all of it.

A likely contributing factor is the market’s dependence on high-frequency liquidity. Historically, many market participants have provided displayed liquidity to markets. These participants were made up of market makers, proprietary traders, institutional traders, and individual investors. But the current market structure has driven many of these participants into trading centers where liquidity is not displayed.

Internalization practices (in which broker/dealers and OTC market makers intercept order flow destined for the public markets) have discouraged traditional market-making participants from displaying liquidity.*

With internalization, orders placed by market participants trading through a retail brokerage account

* The author’s firm, Bright Trading, recently provided comments to the SEC discussing the “toxicity” of order flow in the displayed market. These comments can be viewed in full on the SEC’s “Equity Market Structure” comment board.

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are routed through a number of undisplayed trading centers before being routed to the publicly displayed market. In these undisplayed centers, broker/dealers, OTC market makers, and some high-frequency trading (HFT) firms have the first chance to trade against these orders. If these privileged market participants think they can make money, they will execute against these orders by taking the other side of the trade. The end result is that uninformed orders (those orders more likely to be on the wrong side of the market in the short term) are internalized. Thus, only informed orders (those orders more likely to be on the right side of the market in the short term) are available for displayed market-making participants to trade against. This “toxic” flow gives less incentive for market-making participants to display limit orders in the public market. Even worse, it pushes displayed market-making participants into the undisplayed trading centers as they seek the uninformed order flow. The result is less displayed liquidity, and with less displayed liquidity, markets will be prone to more flash crashes.

The speed and co-location advantages of HFT firms have driven out traditional market makers as well. And unlike traditional market makers, these HFT firms have no affirmative obligations to make markets in turbulent times. In fact, a few of these firms publicly admitted to shutting down their algorithmic programs during the flash crash, which probably exaggerated the fall.

If market participants are going to depend on HFT liquidity, these firms should have some affirmative obligations to provide liquidity during the tough times, not only the good times. In addition, we need to encourage our traditional market makers to display limit orders once again, which would reduce our dependence on this HFT liquidity.

The SEC’s concept of a “trade-at” rule, which would give priority to the displayed NBBO (National Best Bid and Offer), is a possible solution. “The trade-at rule would require an internalizing broker/dealer who is not displaying the NBBO as their quote to either send it to a dealer who is displaying the best quote, or execute the order for their own account at an improved price,” said Daniel Weaver, professor of finance at Rutgers University, in his comments to the SEC offering support for the concept of a trade-at rule. “The end result would be more marketable order flow being sent to displayed markets, encouraging market participants to place more limit orders to interact with this marketable flow.”

Regulators need to address the issue of our fragmented market structure and encourage the public display of liquidity. To avoid another flash crash—or worse, a crash that doesn’t come back in a flash—traditional liquidity providers ought to be encouraged to display more limit orders, because the displayed liquidity currently available doesn’t seem to be reliable. With the current structure, when the going gets tough, these firms stay on the sidelines. ■

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RECOMMENDED RESOURCES

“Managing the Previously Unimaginable”
By Mohamed El-Erian
Conference Proceedings Quarterly (March 2009)
(www.cfapubs.org)

“Reining in Liquidity Risk”
CFA Magazine (July/August 2010)
(www.cfapubs.org)