

2010

lakkyara

Kyara, which means "precious" in ancient Japanese, is an aromatic resin regarded as the highest quality of all agarwood. "lakkyara [la-ká-la]" aims to deliver the same quality as Kyara together with NRI's endeavour for continuous excellence and innovation to provide the most advanced and up-to-date information to our readers worldwide.

vol.80 (28.may.2010)

US equity market hit by "flash crash"



Extreme volatility event in US equity market

On Thursday, May 6, 2010, the US equity market experienced a major dislocation. The day unfolded against a backdrop of mounting uncertainty surrounding the situation in Europe, with Britain holding a general election as Greece's fiscal crisis dragged on. Additionally, the US equity market had sold off in response to doubts about the domestic economic outlook. At 2:00 p.m. EDT, the Dow Jones Industrial Average (DJIA) was down 161 points (approximately 1.5%) from its previous day's close of 10,868.12.

From 2:30, stocks started to plunge despite an absence of market-moving news. Over a five-minute span from 2:42 to 2:47 in particular, the DJIA plummeted 573.27 points (5.49%) to an intraday low 9,872.57, a decline of 995.55 points from its previous day's close. This decline was the largest ever single-day point drop, even worse than in the immediate aftermath of Lehman Brothers' bankruptcy in September 2008. The market subsequently rebounded sharply, with the DJIA soaring 543 points in 90 seconds. The DJIA ended up closing at 10,520.32 (an interday decline of 3.2%) at 4:00 p.m. EDT.

Circuit breakers were not triggered

The DJIA's intraday decline on May 6 was an all-time record in point terms, but in percentage terms it fell short of the DJIA's 22.6% decline on "Black Monday" October 19, 1987.

The New York Stock Exchange (NYSE) has established so-called circuit breakers (Rule 80B) that temporarily halt trading in all stocks in the event of an intraday percentage decline in the DJIA in excess of certain thresholds¹⁾. The circuit breakers were adopted in response to the Black Monday market crash. Although the circuit breakers are an NYSE-specific regulation, nearly all other trading venues where NYSE-listed stocks are traded, including other exchanges and electronic trading platforms, have rules that halt trading if the NYSE's circuit breakers are triggered. The circuit breakers are thus essentially a safeguard common to all US equity markets. However,

under the current standards effective since 1998, the initial circuit breaker is not triggered until the DJIA declines 10%. On May 6, no circuit breakers were triggered because the DJIA's intraday low was only 9.16% below the previous day's close.

Exhibit. NYSE circuit breaker rules

DJIA decline	Time of occurrence	Duration of trading halt
10%	Before 2:00 p.m. Between 2:00 and 2:30 p.m. After 2:30 p.m.	1 hour 30 minutes No halt
20%	Before 1:00 p.m. Between 1:00 and 2:00 p.m. After 2:00 p.m.	2 hours 1 hour All trading halted for remainder of day
30%	Trading halted for remainder of day irrespective of time	

Source: NYSE

Many individual stocks, however, suffered much larger percentage declines during the market's downward spike. One stock fell from \$40 to \$0.01 within an extremely short timeframe. Anomalous price action was common among ETFs in particular. More than one quarter of all ETFs fell in price by over 50% after 2:00 p.m. and a number of them traded down to extremely low prices below \$0.20.

In response, the NYSE and NASDAQ took the unusual action of canceling all trades executed between 2:40 and 3:00 at a price of 60% or more below the latest price as of 2:40. They did so based on exchanges' authority to cancel trades that are obviously aberrant from the standpoint of prevailing market conditions. The cancellations affected trades in 326 issues.

Culprit was not fat finger or futures trading

On May 11, the US House of Representatives' Financial Services Committee's Subcommittee on Capital Markets, Insurance, and Government Sponsored Enterprises held a public hearing to identify the cause of the May 6 "flash crash" and discuss recurrence prevention measures. The hearing featured testimony from Securities and Exchange Commission (SEC) Chairwoman Mary Schapiro, Commodity Futures Trading Commission (CFTC) Chairman Gary Gensler, and executives from the NYSE and other

major exchanges. Although the cause has yet to be definitively identified, the following is a tentative explanation of the mechanisms that triggered the flash crash, based mainly on testimony provided at the hearing on the 11th.

Initially, there was speculation that the flash crash was triggered by a simple order entry error, where a trader intending to sell one million shares mistakenly input the quantity as one billion shares²⁾. If this explanation is factual, the flash crash would be reminiscent of the J-Com fat finger incident that occurred in Japan in December 2005. However, there are no known cases of a fat finger error that had a market-wide impact on trading. This explanation appears to be merely misinformation. There was also speculation that anomalous trading in Procter & Gamble, a DJIA constituent whose shares declined sharply on May 6, triggered a market-wide decline, but this explanation is likewise unconvincing.

A review of events in time sequence essentially confirms that the first market to decline sharply was E-mini S&P 500 futures. The E-mini is currently one of the most widely traded US equity futures products. It reportedly accounts for over 80% of the open interest in US equity index futures. E-mini contracts are traded around around-the-clock on the Chicago Mercantile Exchange's (CME) electronic trading platform.

However, this fact alone is not sufficient basis to conclude that the flash crash was triggered by equity index futures trading. There is nothing unusual about the futures market leading the cash market. Additionally, it is doubtful that a highly liquid instrument like the E-mini would independently exhibit price volatility extreme enough to be veritably described as a "crash." Market plunges drastically at odds with fundamentals typically occur in relatively illiquid markets due to a momentary absence of buyers combined with frantic selling by panicked sellers.

According to the CME, a steep decline in E-mini prices on May 6 triggered (at 2:45:28 p.m.) the CME's Stop Price Logic system, which halts trading for five seconds when prices fall sharply. The CME reported that even though E-mini prices began to rebound once trading resumed after the halt, many stocks in the cash market continued to plummet for several minutes or longer. Additionally, the

CFTC reported that the vast majority of market participants that executed large volumes of trades amid the freefall in futures prices were engaged in both buying and selling as market makers (or liquidity providers). The CFTC found no evidence of a large-scale bear raid.

Did LRPs exacerbate volatility?

One factor suspected of possibly exacerbating market volatility on May 6 is the NYSE's Liquidity Replenishment Point (LRP) system, which is intended to normalize disorderly trading by automatically suspending electronic trading in any individual stock that has declined 1–3% within 30 seconds. For the duration of the electronic trading halt, the stock is traded on the NYSE's floor, where price quotes are presumed to be fair. The LRP system is based on a concept similar to special quotations in the Japanese equity market³⁾.

Market participants are well aware that major imbalances between supply and demand cause outsized price movements. In such instances, there is absolutely nothing inappropriate about the LRP system's aim of helping to restore orderly trading. However, some are concerned that LRPs may not be entirely compatible with the current market structure, where new trading techniques such as computerized high-frequency trading (HFT) are widely prevalent.

Specifically, when LRPs were triggered by large declines in individual stocks such as P&G, high-frequency traders unable to access the NYSE's floor-trading venue with their computer programs temporarily stopped trading completely. Meanwhile, sell orders that were not executed instantaneously by the NYSE's electronic trading system were rerouted to the NASDAQ and other trading venues' electronic trading platforms by market participants in a rush to sell.

Most importantly, the bids quoted on the NYSE floor in the aim of stabilizing the market based on LRPs were more advantageous to sellers than the bids quoted on other markets, but sell orders were nonetheless routed to the other markets in disregard of the bids available on the

NYSE. Such order routing (known as "trading through") is in principle prohibited by Regulation NMS, which is intended to ensure best execution across all markets, but Regulation NMS does not apply in instances where the better price quote is displayed by a market with an order processing lag time, such as the NYSE floor.

Accordingly, the NYSE's LRPs are suspected of not only failing to fulfill their intended purpose of stabilizing the market but having the opposite effect by causing mass rerouting of sell orders to nearly bid-less non-NYSE trading venues as high-frequency traders vanished from the market.

Market's dramatic rebound and lingering mysteries and issues

In any case, many market participants found it strange that securities trading at prices in the \$20–50 range a few hours earlier fell to sub-\$1 prices without their issuers having gone bankrupt in the interim. In fact, quite a few market participants reported seeing such price anomalies as once-in-a-lifetime buying opportunities and placing buy orders in response⁴. By virtue of a surge in such buy orders coupled with a decrease in additional sell orders, the market embarked on a self-sustaining rebound. Once it had rebounded above the NYSE's LRP activation threshold, high-frequency traders that had suspended trading returned to the market and trading largely returned to normal.

Of course, explanations such as the above by no means clarify everything that occurred on May 6. Particularly puzzling is that ETFs that theoretically should be priced based on their net asset value, which in turn is a function of prices of the cash-market equities they hold, experienced price declines far beyond the percentage declines of their stock holdings. Some attribute this discrepancy to problems with trading programs that buy or sell in response to price divergences between cash-market stocks and ETFs. Whatever the cause, we hope it is eventually identified.

Another claim is that the price decline was accelerated by stop loss orders that are executed as market orders if

the designated stock's price falls below a predetermined price level, but further investigation will likely be required to determine the extent of stop loss orders' impact and the need for corrective measures if such orders were indeed a contributing factor.

Circuit breakers and price fluctuation limits

Investigation of the causes of the events of May 6 will continue, led by the SEC and CFTC. At the same time, efforts will be made to devise measures to prevent recurrence. Applying circuit breakers, which are currently triggered solely by the DJIA's level, to individual stocks will likely be discussed as part of this process. Another issue likely to be addressed is how to design specific safeguards that are limited in scope like the NYSE's LRPs.

In response to the May 6 flash crash and resultant confusion, more than a few Japanese market participants have expressed surprise that the US has no price fluctuation limits. It is safe to say that in the Japanese equity market, anomalous declines of 50–60% could never occur, even in individual stocks, because such declines would violate price fluctuation limits⁵. Some apparently even take the view that the Japanese market is "safer" than the US market by virtue of the existence of price fluctuation limits⁶.

However, it would be shortsighted to conclude based on the events of May 6 that the Japanese system is better. US-style circuit breakers aim to merely provide an opportunity for dissemination of accurate information to market participants by temporarily halting trading. Even if the circuit breakers are triggered, there is an underlying assumption that trading will subsequently resume. This same approach will likely be applied to any prospective circuit breakers for individual stocks.

In contrast, Japan's price fluctuation limits prohibit price movements that exceed a certain magnitude, even if trading is proceeding normally without any panic on the part of market participants. As such, they are fundamentally inimical to fair pricing and free trading of equities. This is a serious side-effect that cannot

be overlooked. Price fluctuation limits are based on a fundamental distrust of the market mechanism in that they imply the existence of a "correct" share price other than the free market price. In terms of underlying mentality, price fluctuation limits have much in common with stock price support measures, whereby designated entities buy stocks to prop up the market.

Even in the US, largely groundless criticism of HFT and electronic trading has intensified in response to the recent flash crash. It remains to be seen how US authorities will respond. Hopefully they will identify the flash crash's causes and devise recurrence prevention measures without losing sight of the fundamental principle that fair trading in highly liquid markets leads to "correct" price discovery.

Note

- 1) The NYSE has on occasion halted trading in all stocks irrespective of price action in response to emergencies such as President Kennedy's assassination in 1963, the attempted assassination of President Reagan in 1981, and the terrorist attacks of September 11, 2001.
- 2) Such simple order entry errors are called "fat finger" errors (i.e., the trader unintentionally pressed the wrong key because his fingers are too fat). Fat finger incidents have occurred in the past.
- 3) Special quotations are quotations specially displayed by an exchange when a stock is quoted bid only or offer only due to an imbalance between supply and demand.
- 4) However, the aforementioned trade cancellations subsequently stripped some of these market participants of profits they thought they had made.
- 5) The aforementioned J-Com fat-finger trade executed at an anomalous price triggered substantial volatility, albeit largely because the trade occurred in premarket trading, before opening-price discovery. Price fluctuation limits were consequently not yet set for the day.
- 6) Nikkei Veritas, May 16, 2010; page 63.

Author's Profile

Sadakazu Osaki

Head of Research
Center for Strategic Management and Innovation

E-mail : kyara@nri.co.jp

The entire content of this report is subject to copyright with all rights reserved. The report is provided solely for informational purposes for our UK and USA readers and is not to be construed as providing advice, recommendations, endorsements, representations or warranties of any kind whatsoever. Whilst every effort has been taken to ensure the accuracy of the information, NRI shall have no liability for any loss or damage arising directly or indirectly from the use of the information contained in this report. Reproduction in whole or in part use for any public purpose is permitted only with the prior written approval of Nomura Research Institute, Ltd.

Inquiries to : Center for Financial Markets and Technology Research
Nomura Research Institute, Ltd.
Marunouchi Kitaguchi Bldg.
1-6-5 Marunouchi, Chiyoda-ku, Tokyo 100-0005, Japan
E-mail : kyara@nri.co.jp

<http://www.nri.co.jp/english/opinion/lakyara>