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May 25, 2010

Securities and Exchange Commission
100 F St. NW
Washington, DC 20549-9303
Rule-comments@sec.gov

File Numbers: SR-BATS-2010-014, SR-BX-2010-037, SR-NASDAQ-2010-061, SR-NSX-2010-05, SR-NYSE-2010-39, SR-NYSEArca-2010-41, SR-NYSEAmex-2010-46, SR-ISE-2010-48, SR-EDGA-2010-01, SR-EDGX-2010-01, SR-CBOE-2010-047, SR-FINRA-2010-025

Dear Securities and Exchange Commission:

Here are my comments on the proposed circuit breakers.

As I have repeatedly warned the Commission that our high frequency markets need high frequency protection, I believe the proposed circuit breakers are an important first step in dealing with electronic glitches in our markets. [2] However, there is more to be done to provide adequate market safeguards in the electronic era. In summary,

[1] I am also a public member of the boards of the Edga and Edgx exchanges. These comments reflect my own views and not necessarily those of the Edga or Edgx exchanges or Georgetown University.

[2] See, for example, http://www.sec.gov/comments/s7-02-10/s70210-181.pdf , http://www.sec.gov/comments/s7-02-10/s70210-172.pdf , http://www.sec.gov/comments/s7-02-10/s70210-54.pdf , http://www.sec.gov/comments/s7-08-09/s70809-4658.pdf , http://www.sec.gov/comments/s7-08-09/s70809-3758.pdf , and http://www.sec.gov/comments/4-581/4581-2.pdf)

- It appears that the events of May 6 echo the crash of October 19, 1987 in which the market mechanism failed to keep up with the volume. The volume of data on May 6, 2010 apparently overwhelmed IT systems in several places, causing enough uncertainty that it led important electronic liquidity providers to temporarily withdraw from the market. This caused further instability in the market.

- The length of time it has taken the SEC to understand the cause of the disruptions of May 6 indicates just how poorly the SEC really understands today's markets and demonstrates the need for a major overhaul in how the SEC monitors the markets and trains its personnel.

- The proposal is a good first step, but SEC also needs to be concerned about disruptive events outside the 9:45 to 3:45 window of the proposed rules.

- Companies outside the S&P500 should be brought into the pilot as quickly as possible. They may, however, need a trigger more than 10%.

- We need contingency plans for another major glitch that would trigger the circuit breakers in hundreds of stocks at the same time.

Part I: Comments on the events of May 6

Our market network could not keep up with the volume of message traffic.

Here is my understanding of the market disruption of May 6, 2010. We have several important clues:

1. The markets were already jittery because of concerns over the economic problems in Greece.
2. Market prices were generally falling and the volume of trades was very high.
3. According to media reports, technical problems occurred at several major firms.[3] These include problems with data feeds critical to trading operations.
4. Several exchanges declared "self help" against the NYSE/ARCA exchange, indicating additional technical problems. The NYSE/ARCA exchange lists many exchange traded funds (ETFs).
5. Many of the hardest hit stocks were ETFs.
6. Media reports indicate that several large "high frequency" trading firms stopped trading.

[3] See Patterson, Scott, Trading-Firm Breakdowns Accompanied Market Chaos, *Wall Street Journal*, May 20, 2010, Page C1, http://online.wsj.com/article/SB10001424052748704691304575254842975842532.html?mod=WSJ_WSJ_US_PoliticsNCampaign_4.

7. The Liquidity Replenishment Points (LRPs) were activated for many NYSE-listed stocks.

The following is a likely explanation:

The "flash crash" occurred as a result of the failure of the market network in several places to keep up with the high volumes of message traffic. This was similar to the mechanical problems that occurred during the crash of 1987. In 1987, the market mechanism could not handle the volume. Phones were not answered at brokers and market makers, and printers jammed at the NYSE. The uncertainty about current market conditions and whether a trade could actually be executed exacerbated the market volatility that occurred. On May 6, 2010, IT problems at many different places in the market network caused similar disruptions.

Trading firms need to have reliable and timely data in order to trade. Furthermore, they need to be confident that they can actually trade with other market participants at posted prices in a timely manner. When there are problems with the reliability of the data feeds and uncertainty about whether they can actually execute trades at the posted prices, it is prudent to step aside until the technical uncertainties are resolved.

So-called "high frequency" traders generally earn very thin margins on each trade, typically averaging a mere fraction of a cent on each share traded. They cannot afford the risk of trading in disorderly conditions.

Many of the trading strategies of these firms normally stabilize prices. For example, some of them act as market makers and attempt to buy at the bid and sell at the offer prices. Others arbitrage related instruments, such as ETFs and the stocks in their constituent indices.

The very high volume of trading caused technical problems in many places around the market network. High message traffic may cause unacceptable delays in receiving market data. Even though these delays may seem small, the variability of such delays could cause serious problems for some trading strategies.

The technical glitches in the market apparently pushed enough of these beneficial high frequency traders to the sidelines that liquidity disappeared. The problems with NYSE/ARCA, the listing market for many ETFs, in conjunction with the other data issues, apparently caused many of the firms that arbitrage ETFs to stop trading. This meant that there was little liquidity in the order books for these stocks, and marketable orders ended up executing at absurdly high as well as low prices.

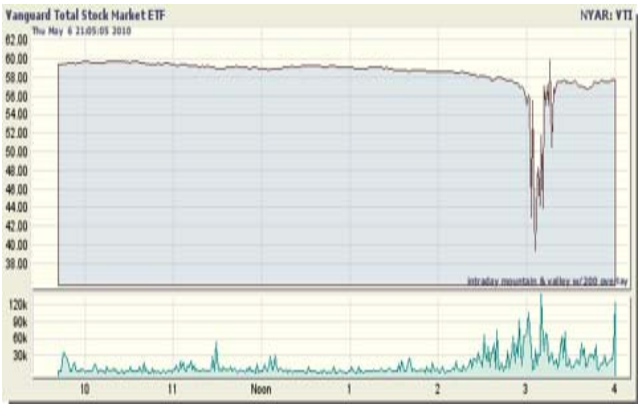
Sloppy algorithmic traders probably also contributed to the events. For example, an overly simple strategy to match the VWAP for an institution such as a mutual fund trying to sell a large block of stock would have blindly kept on selling even as a stock plummeted to absurd levels.

Once prices started falling rapidly, other traditional forces likely accelerated the downdraft. Falling prices triggered stop orders, causing more selling pressure on the market.

Option market makers normally tend to be long calls and short puts, as other investors often engage in selling "covered calls" and/or purchase puts for insurance. In order to hedge their exposure, the market makers need to short the underlying equity. As prices fell, they needed to sell even more shares in order to maintain a "delta neutral" hedge. This added more selling pressure to the market.

Given the already falling nature of stock prices, it is also likely that there was a forced selling from intraday margin calls.

Putting all these events together, we had the tornado:[4]



<u>Such events are inevitable. We need to be prepared.</u>

Our market is an ever evolving complex IT network that connects market participants together. It consists not only of exchanges, but of a vast infrastructure of interconnected entities. These include numerous national securities exchanges, alternative trading systems, options exchanges, futures exchanges, brokers, dealers, futures commission merchants, securities information processors, data vendors, analytics vendors, investment companies, communications companies, accounting firms, media companies, web sites, data centers, clearing entities, electric utilities, investors and more.

Much as Sun Microsystems has popularized the notion that "The network IS the computer," I have been trying to make the point that "The network IS the market."

Most of the time this market network works better, faster, and cheaper than ever before. It is also a remarkably fault tolerant network. There is so much redundancy in the system that problems at any one part of the network are rarely noticed elsewhere. Exchanges almost daily invoke "self help" when they claim that other exchanges are not responding in a timely manner, and these events are so routine that they almost never make the financial press.

[4] Graph from http://seekingalpha.com/article/203798-10-shocking-etf-charts-from-flash-crash , picture of tornado from http://en.wikipedia.org/wiki/Tornado

However, large complex systems sometimes fail in unexpected ways. This is what we saw on May 6. Even after we track down the proximate causes of the disruption on May 6 and attempt to prevent a recurrence, our highly nonlinear and complex network, just like any human system, will eventually glitch again in some unexpected way. We need to be prepared for such unexpected events and have mechanisms in place for dealing with an unstable network even when the individually regulated nodes appear to be functioning properly.

The SEC needs better market intelligence.

In order to maintain fair and orderly markets in the public interest, the SEC must understand the inner workings of the complete market infrastructure, not just the regulated entities over which it has direct jurisdiction. This requires skills not only in law, which the SEC has in overabundance, but in finance, accounting, information technology, banking, psychology, marketing, operations, and common sense. It also requires a pro-active effort to understand what all the different players, regulated and unregulated, are doing in the market. It requires having fast access to good data about who is doing what, and the capacity to analyze that data accurately. It also requires good human contacts with the major and minor players in the industry so that the SEC can quickly acquire needed "color" on what is happening.

The length of time that it has taken the SEC to diagnose the problems of "Tornado Thursday" is very troubling. It is apparent from the preliminary report that the SEC has been struggling to really understand the marketplace.

The work on a consolidated audit trail and large trader identification is a first step, but data alone won't do it. It requires people who know what to look for in the data, and people who know how to find out what is going on. This requires a constant effort to train the SEC staff to keep up with the evolution of the industry. It requires constantly sending people to visit market participants to gain an understanding of how the markets (equity, fixed income, and derivative) work.

Part II: Specific comments on the circuit breaker proposals.

The proposed circuit breakers are a first step toward dealing with the problems demonstrated on May 6. However, the current proposal is a hasty stop gap that should be refined.

Five or ten minutes may not be enough time to safely re-open trading.

It may take humans more than five minutes to determine whether or not there is news pending or some system malfunction that would preclude the restarting of a fair and orderly market. The listing exchanges should be prepared to call a regulatory halt in such conditions. The rules should be clear that if a regulatory halt is called, the UTP exchanges cannot start trading until the halt is over.

We need to plan for simultaneous tripping of circuit breakers in hundreds or thousands of stocks.

It is possible that another glitch could occur that would result in the simultaneous tripping of the circuit breakers in hundreds or thousands of stocks. We need a contingency plan for how to handle the simultaneous tripping of circuit breakers in hundreds or even thousands of stocks. Under such disorderly conditions it is unlikely that the market will be discovering the correct prices. It is also highly likely there are numerous system glitches at different parts of the network and time is needed to catch up. The prudent thing would be to switch to a different price discovery mechanism by pausing the entire market and restarting the market with the opening call auctions. One possibility would be to call a market-wide 15 minute pause in trading if 10 or more DJIA stocks tripped or 50 of the S&P500.

The open and close are left out, as are the pre-open and post-close trading periods.

Considerable trading activity (and volatility) takes place in during the first and last minutes of the trading day. Circuit breakers should be extended to this period as soon as possible. Furthermore, we have had several recent incidents requiring the busting of trades in the pre-open and post-close time periods, and there should be a mechanism to prevent erroneous trades during that time period.

The trading day should be extended if needed.

If a circuit breaker is tripped late in the day, regular way trading should be extended so that investors have at least 15 minutes after trading resumes to fill orders and balance out positions before the overnight period. Knowing that the trading day will be extended in a fair and orderly manner will prevent panic selling near circuit breaker thresholds as panicky investors try to exit positions before the market closes for the day.

Non-S&P500 stocks are left out even though they need protection more than the S&P500.

The proposing release starts with the S&P500 stocks. However, these stocks are mostly larger and less volatile than non S&P500 stocks. These other stocks need this kind of protection even more than the S&P500. Some stocks should, however, have a different percentage trigger. For example, some less liquid stocks may have a bid-ask spread of 10% and thus simple bid-ask bounce would trigger the halt.

An ounce of prevention is worth a pound of cure: It is best to prevent clearly erroneous trades than to bust them.

Well functioning circuit breakers should prevent clearly erroneous trades. Waiting until after a bad trade takes place in order to halt trading means that some damage has already been done. It would be more prudent to trigger the circuit breakers if either the NBBO OR the trade price jumps too far too fast.

The practice of cancelling "clearly erroneous" trades also added to the uncertainty on May 6, 2010. Investors who would otherwise have jumped in to snap up cheap stocks may have hesitated out of fear that the purchases would be cancelled. If the buy trade was cancelled but not a later sell trade, such investors would have an unintended naked short position and potentially suffer severe losses.

Consider the impact of the triggering print on indices, derivatives, and margin accounts!

Preventing erroneous trades before a trading halt is especially important because of the impact of the last print recorded before the trading halt. Since many risk management systems use the last print to value a position, a bad price may cause serious financial disruption. For example, let's suppose an investor has a large part of their portfolio invested in VTI, the Vanguard Total Stock Market ETF, which is a prudent thing to do. This is a large, well diversified ETF. Suppose that they have borrowed money from their brokerage margin account because the after-tax interest rate is quite reasonable. During the recent meltdown, VTI was one of the stocks whose price collapsed to as low as $.15. If the price of VTI were reported as $.15 during a halt, some brokers may well automatically liquidate part of the account as part of a margin call, adding further distress to the market.

Clearly erroneous trades SHOULD set off the circuit breakers.

The proposed language to ignore "clearly erroneous trades" for the decision to impose trading halts is not practical. For one thing, currently it takes from several minutes to several hours for the exchanges to decide whether a trade is clearly erroneous. Secondly, it is when the system is malfunctioning that we want to halt trading until we can fix the problem.

Consider a volume-based market-wide circuit breaker.

It appears that the high volume of message traffic exceeded the ability of the market infrastructure to handle the traffic. One possibility would be to call a market wide "volume pause" if the system volume exceeds certain metrics, such as total message traffic at key nodes in the system. In this way, we would not have unstable failures driven by unpredictable parts of the system.

Stop orders should be required to have limit prices.

It is clear that in times of great uncertainty that unpriced orders can accelerate volatility. Rapidly falling prices can trigger stop orders that add to the downward pressure on the stock. If the stop orders are market orders, then the acceleration could be even worse. It would be prudent to require investors placing stop orders to also specify limit prices on those orders.

Market orders should be restricted to small retail orders.

Large market orders can cause great havoc, especially in times of market upheaval, and consequently their use should be limited. Sophisticated investors are quite familiar with limit orders and would have no problems using them. They can easily monitor market conditions and put an aggressive price on an order in order to guarantee immediate execution. Thus, it should be no hardship to forbid brokers and exchanges from accepting market orders from non-retail accounts.

On the other hand, many retail investors are unsophisticated and are not familiar with limit orders. They should be permitted to use market orders for orders less than $100,000. Brokers should be permitted and encouraged to convert customer market orders to marketable limit orders with limit prices near the current NBBO in order to prevent erroneous executions.

Consider the interaction with the new uptick rule.

The new short sale rule also kicks in when a stock drops 10% from the previous close. Careful thought should be given to how the short sale restrictions interact with the circuit breakers.

What happens during the latency period?

It will likely take several milliseconds or longer for the listing exchange to determine that the circuit breaker has been triggered, to issue a trading halt order, and for the other market participants to receive the order and halt trading. During that latency period, it is likely that many trades will have executed. What is the status of those trades? Will they be immediately cancelled or allowed to stand? Some thought and guidance needs to be given in this situation.

Trading halts need to be tested and practiced. Let's do it on September 11.

One of the problems with the market-wide circuit breakers implemented after the crash of 1987 is that they have only been implemented once and there is still great uncertainty as to how systems – and people – will react under the conditions that would trigger such halts. It is very important to test these systems in the normal industry-wide testing that routinely occurs for new systems. It is also important to conduct annual fire drills during the trading day to see what happens when the market stops and restarts in non routine ways.

One possibility would be have such a preplanned trading halt each year on September 11 as both a memorial to the victims of the terrorist attack and as a reminder of the need for disaster preparedness. Such practice would give all market participants (and not just the operations people who do the weekend tests) some experience in reopening a market that has been entirely halted. Our normal market opening in the morning is a soft opening because the computers have been running for several hours before the "official" opening at 9:30 am. The restart after a trading halt is different because we don't have the benefit of the price discovery that has occurred in the trading before 9:30.

Part III: General Thoughts

LEARN FROM THE REST OF THE WORLD!

The United States has been a laggard at automating its financial markets, and it can learn from the experience of other countries in ways of stabilizing electronic markets. The SEC staff should conduct and publish a survey of the control measures used by other countries around the world. Indeed, examining the experience of the rest of the world should be a standard practice for all SEC activities including rule making.

In particular, the German Xetra system appears to have a particularly elegant mechanism for volatility interruptions. The system calculates both a static trading range based on changes in pricing since the opening of the trading period and a dynamic range based on recent price movements. We should pay more attention to the experience that they have gained with this system in developing our own system.

The SEC should post the complete texts of rule changes on its web site.

The texts are left out of the material posted on the SEC web site.

The SRO filings generally contain text such as "The text of the proposed rule change is available at the Exchange's Web site at …." It is often difficult to navigate through the exchange web sites to find the actual text. The SEC should post the actual text of the proposed change on the SEC web site.

Respectfully submitted,

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