

## **Examining the Causes and Lessons of the May 6th Market Plunge**

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### **I. Introduction**

Chairman Reed, Ranking Member Bunning, and Members of the Subcommittee:

I appreciate the opportunity to testify concerning the market disruption that occurred on May 6, 2010.<sup>1</sup> The sudden decline and recovery of the U.S. financial markets on that day was unprecedented in its speed and scope. It is vital that investors and listed companies feel confident in the integrity of the prices generated by our equities markets.

During a 20-minute period during the afternoon of May 6, the U.S. financial markets failed to live up to their essential price discovery function. That period of gyrating prices directly harmed those investors who traded based on flawed price discovery signals, and it undermined the confidence of investors in the integrity of the markets. We are committed to taking all necessary steps to identify causes and contributing factors and are already working to reduce the likelihood of a recurrence of that day.

Over the last fourteen days, the SEC has focused intensely on moving forward on two separate, but related, fronts. First, we, along with the Commodity Futures Trading Commission (CFTC), have been engaged in a comprehensive investigation into the events of May 6 to gain a full understanding of what caused the volatility. Second, even as we work to understand the causes of the volatility, we have worked with the exchanges to fashion effective measures that will operate to help protect against a recurrence by imposing a limit on the extent to which prices can move in individual stocks before there is a pause in trading. We are also addressing a number of additional areas that may have contributed to the volatility. These are discussed below.

With respect to our investigation, this past Tuesday, SEC and CFTC staff issued a joint report of their preliminary findings regarding the market events of May 6 to the

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<sup>1</sup> My testimony is on my own behalf, as Chairman of the SEC. The Commission has not voted on this testimony.

Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues (Staff Report).<sup>2</sup> The establishment of the Committee was one of the recommendations included in the agencies' joint harmonization report issued last year.<sup>3</sup> The Staff Report sets forth the preliminary findings of the ongoing review of the events of May 6. It briefs the Advisory Committee regarding the events and provides context regarding the current structure of the equity and futures markets, and the regulatory framework for those markets. The Staff Report is intended to assist the Advisory Committee as it works with us to review the events of May 6. I expect that the Committee will advise the Commission with respect to market structure problems that may have led to the volatility experienced on that day and suggest potential approaches.

In addition, earlier this week, the stock exchanges and the Financial Regulatory Industry Authority (FINRA) filed proposals that would aid in preventing the type of severe price swings that some individual stocks in the S&P 500 experienced on May 6. These rules would establish a market-wide five-minute trading pause in the event that the price of a stock in the S&P 500 moves more than 10 percent during the preceding five minutes. The pause would give the markets the opportunity to attract additional liquidity in the stock, establish a reasonable market price, and resume trading in a fair and orderly fashion.

My testimony today first will summarize the events on May 6, using the best information that is available at this point. Next, it will give a brief summary of initial steps taken to identify the causes and contributing factors of the unusual market activity on May 6, as well as initial steps to help protect against such activity from occurring in the future. Finally, I will discuss various potential regulatory responses that need to be considered in determining how best to maintain fair and orderly financial markets and to prevent subsequent severe market disruptions.

## **II. Summary of Events on May 6, 2010**

### **A. Chronology of Trading**

On Thursday May 6, the stock markets had spent much of the morning and early afternoon in moderately negative territory, with the Dow Jones Industrial Average ("DJIA") declining 161 points, or approximately 1.5 percent, by 2:00 p.m. (ET). Concerns over the financial situation in Greece, uncertainty concerning elections in the United Kingdom, and an upcoming jobs report, among other things, hung over the market. Shortly after 2:30 p.m., however, the market decline began to steepen and, by 2:42 p.m., the DJIA was at 10,445.84, representing a decline of approximately 3.9 percent. The DJIA then suddenly dropped an additional 573.27 points, representing an additional 5.49 percent decline, in just the next five minutes of trading, hitting 9,872.57 at

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<sup>2</sup> *Report of the Staffs of the CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues*, May 18, 2010. <http://www.sec.gov/sec-cftc-prelimreport.pdf>

<sup>3</sup> *Joint Report of the SEC and the CFTC on Harmonization of Regulation*, October 16, 2009.

2:47 p.m., for a total drop of 9.16 percent from the previous day's close (which, as discussed below, was not sufficient to trigger the existing circuit breaker trading halt).

Our preliminary analysis shows that this precipitous decline in stocks (and the subsequent recovery) followed very closely the drop (and recovery) in the value of the E-mini S&P 500 future (which tracks the normal relationship between futures and stock prices for the broader market). Similar declines were seen in stock market indexes other than the DJIA, such as the S&P 500 Index. In addition, the CBOE Volatility Index ("VIX"), a widely followed measure of market volatility sometimes known as the "fear index," climbed above 40, a level not reached in over a year.<sup>4</sup>

As quickly as the market dropped, it suddenly and dramatically reversed itself, recovering 543 points in approximately a minute and a half, to 10,415.65. By 3:00 p.m., the total daily decline in the DJIA had been reduced to 463.05 points (4.26 percent). The DJIA ended the day at 10,520.32, down a total of 347.80, or 3.20 percent, from the prior day's close. This represented a significant down day for the markets, but the closing numbers belied the market's dramatic moves down and then up during approximately 20 minutes of trading in the mid-afternoon. In addition, as has been widely reported in the press, many individual securities experienced much larger swings in their trading activity. For example, two DJIA components – Procter & Gamble and 3M – experienced declines of approximately 36 percent and 18 percent, respectively. In addition, trades in certain stocks were executed at absurdly low prices, such as one stock which opened above \$40, was traded at one point at a penny, and then closed the day above \$40. Figure 1 in Appendix A illustrates the volatility of this activity. This extreme volatility in the markets suggests the occurrence of a very severe temporary liquidity failure, rather than the effect of any economic factor that might explain price discovery indicating that the equity value of U.S listed companies truly could drop and recover such a large amount in just a few minutes.

In addition, a large number of registered investment companies known as Exchange Traded Funds ("ETFs") traded for short periods of time with massive intraday price swings. The shares of more than 25 percent of all ETFs experienced temporary price declines of more than 50 percent from their 2 p.m. market prices. One large ETF sponsor reported to us that 14 of its domestic stock ETFs experienced executions of \$.15 or less per share (including five ETFs that had executions of one cent or less) while also observing that its domestic bond ETFs appeared to execute at reasonable prices. We also will explore whether the practice of shorting ETFs by institutional investors to effectively eliminate broad market exposures might have contributed to the intraday price swings experienced by certain ETFs.

## **B. Breaking of Clearly Erroneous Trades**

As the markets closed on May 6, officials from each of the equity markets, pursuant to exchange rules, worked out a common standard to cancel trades that were

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<sup>4</sup> See Appendix A, Figures 2 and 3.

effected at prices that were sharply divergent from prevailing market prices (so-called “clearly erroneous” trades). The exchanges determined to cancel any trades effected from 2:40 p.m. to 3:00 p.m. at prices 60 percent away from the last trade at or before 2:40 p.m. Transactions in 326 individual securities were canceled in this manner. In addition, on Friday May 7, several options exchanges similarly decided to cancel certain options trades from the afternoon of May 6.

A significant number of broken trades were in the shares of ETFs. These funds are hybrids – they are mutual funds that have shares that trade throughout the day like ordinary stocks. ETF sponsors reported to us that, internally, they experienced no significant problems in managing the funds on May 6. Stability had returned to the market by the 4 p.m. market close and, as a result, these funds were able to calculate their net asset values based on the market prices of the securities in their portfolios as required by our rules. From the viewpoint of the ETFs, they saw nothing out of the ordinary or unusual compared to any other day in computing their end-of-day net asset values.

Information on broken trades clearly suggests that ETFs as a class were affected more than any other category of securities. We continue to investigate precisely why they were affected so dramatically.

### **C. Evaluation of Trading**

The Commission is committed to understanding fully and exactly what occurred on the afternoon of May 6, and has been aggressively investigating and analyzing the events of that day. We believe it is critical to understand the causes and effects of this event so that we can work to ensure that it does not occur again. Throughout this time, the Commission and its staff have been in close and continuous contact with the CFTC and other federal agencies, as well as the larger national securities exchanges, FINRA, and clearing organizations. In addition, we have been in contact with a wide variety of market participants, including broker-dealers, proprietary trading firms, and asset managers. We have obtained extensive data from the exchanges and other market participants and are in the process of analyzing that data to ascertain the triggers and impacts of trading that day.

The Commission also has been in close contact with our foreign counterparts. Some of our counterparts have circuit breaker-like market intervention mechanisms linked to our own and others have market intervention mechanisms that halt trading on specific securities affected by unexpected market volatility. This coordination will continue as we seek information on specific trades or events that may have precipitated any problems.

The various regulatory authorities are making substantial progress in analyzing the trading on May 6 and sifting through the voluminous trading records involved (including more than 17 million trades in listed equities between 2 p.m. and 3 p.m. alone). We will continue to provide investors and the public with information on the events that may have contributed to this volatility as it becomes available, as we have

done with our preliminary staff report issued this week, but we should recognize that it will take time to fully analyze the data and cross test our different hypotheses.<sup>5</sup> Although developments in the markets and in technology may help speed access to market data, they also greatly complicate our efforts to analyze the complex web of trading arrangements and market dynamics that have developed since 1987. For example, the key day in the 1987 Market Break Study involved a trading session processing a little over 600 million shares in NYSE stocks. On May 6, the markets processed 10.3 billion shares in NYSE stocks alone.

In addition, the interconnections among markets and among equity securities and derivatives have grown immensely more complex over the past few years. Orders in one stock directed to one market can now ricochet to other markets and trigger algorithmic executions in other stocks and derivatives in milliseconds. By contrast, in 1987, investigators could focus their attention on discrete transactions largely effected on only one or two markets.

To conduct our analysis, we are obtaining and reviewing data regarding order books and order audit trails from various sources to understand the behavior of providers and consumers of liquidity. This involves billions of data elements regarding millions of trades in thousands of securities executed in milliseconds. This data will be the subject of targeted analysis by SEC staff.

We plan to examine in more detail data on options transactions and quotes to better understand the role that participants in this market may have played.<sup>6</sup> We also expect to examine existing data on institutional mutual fund and ETF holdings, as well as data from broker-dealers that will help attribute trades to specific brokerage accounts. In addition, we will examine trade and order characteristics to determine whether specific order types played a role in the breakdown of the price discovery mechanism.

Another key component of our analysis is examining the behavior of groups of market participants. For example, we will continue to examine the role of providers of liquidity, including market participants who have formal obligations under the federal securities laws or SRO rules. To the extent that data is available, we will seek to understand the impact of traders following high-frequency or algorithmic trading strategies. Many proprietary trading firms engage in automated strategies that continually monitor the various markets and products for disparities in prices. When the trading systems for these firms spot such disparities, they can generate in microseconds an enormous volume of orders that are intended to capitalize on these disparities. We also will examine the activities of ETF Authorized Participants in order to understand what, if any role, they played, in the markets of May 6.

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<sup>5</sup> The report setting forth the events of the October 1987 Market Break was released months later, in January 1988.

<sup>6</sup> Our initial options analysis suggests that there were not triggers originating from the options markets.

Even as our investigation into this matter continues, a preliminary picture is beginning to emerge. At this point, we are focusing on the following working hypotheses and findings—

- (1) possible linkage between the precipitous decline in the prices of stock index products such as index ETFs and the E-mini S&P 500 futures, on the one hand, and simultaneous and subsequent waves of selling in individual securities, on the other, and the extent to which activity in one market may have led the others;
- (2) a generalized severe mismatch in liquidity, as evinced by sharply lower trading prices and possibly exacerbated by the withdrawal of liquidity by electronic market makers and the use of market orders, including automated stop loss market orders designed to protect gains in recent market advances;
- (3) the liquidity mismatch that may have been exacerbated by disparate trading conventions among various exchanges, whereby trading was slowed in one venue, while continuing as normal in another;
- (4) the use of “stub quotes”, which are designed to technically meet a requirement to provide a “two sided quote” but are at such low or high prices that they are not intended to be executed;
- (5) the use of market orders, stop loss market orders and stop loss limit orders that, when coupled with sharp declines in prices, for both equity and futures markets, might have contributed to market instability and a temporary breakdown in orderly trading; and
- (6) the impact on ETFs, which suffered a disproportionate number of broken trades relative to other securities.

We have found no evidence that these events were triggered by “fat finger” errors, computer hacking, or terrorist activity, although we cannot yet completely rule out these possibilities.

As we move forward in our inquiry into the events of May 6, we are focusing on several important issues.

## **1. Linkages between Futures and Securities Markets**

One focus has been the role of the E-mini S&P 500 future in leading the market decline and recovery. To a great extent, this concern reflects a basic fact of market dynamics — much of the price discovery for the broader stock market occurs in the

futures markets. Those who believe that the broader market is overpriced (or underpriced) often will first sell (buy) futures for a broad market index rather than sell (buy) the individual stocks that make up that index. Moreover, many professional traders study the relationship between futures prices and stock prices. If they see a decline (rise) in the price of the futures compared to the price of the stocks, they will sell (buy) the underlying stocks in expectation that the stock prices quickly will follow the futures price. Indeed, this type of activity helps assure that stock prices will closely follow futures prices up or down.

Accordingly, given that the E-mini S&P 500 futures price fell by more than 5 percent in a few minutes and then quickly recovered all of the 5 percent decline, it should be no surprise that the broader stock market indexes showed similarly fast and similarly large declines and recoveries. It must be recognized, however, that the fact that stocks prices follow futures prices chronologically does not demonstrate what may have triggered the price movements. The triggering factor may have been an event in the futures market (such as an exceptionally large order), but it could have been other factors as well. In the coming days, we intend to pursue this critically important linkage between the derivatives and equities markets that so significantly affects the price discovery that indicates the value of individual listed companies and of investor portfolios.

## **2. Absence of Professional Liquidity Providers**

According to anecdotal evidence, as well the large number of trades that executed against stub quotes, as discussed below, it appears that some professional liquidity providers<sup>7</sup> temporarily did not participate in the market on the buy side in many stocks that suffered particularly egregious price declines, whether because of an intentional decision to withdraw or because of specific market practices. Some types of professional liquidity providers have “affirmative” obligations to provide liquidity whether the market is up or down, as well as “negative” obligations not to take liquidity in ways that would destabilize the markets. Other professional liquidity providers do not have such responsibilities, including some of the high frequency proprietary trading firms that also are discussed below.

There is evidence that some firms that had previously been active participants in the markets withdrew their liquidity after prices declined rapidly. These firms may have acted appropriately under current rules, as a firm’s risk models may have concluded that the action in the market presented too substantial a risk. As discussed below, however, we are looking at the data and considering the types of obligations that should apply to certain liquidity providers.

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<sup>7</sup> Professional liquidity providers are proprietary traders in the business of providing liquidity to the market, often through the submission of limit orders that rest on the electronic order books of exchanges and other trading venues. They include registered entities, such as exchange specialists and market makers, as well as unregistered proprietary trading firms that engage in passive market making and other types of trading strategies.

### 3. Disparate Exchange Practices

The decline in the market on May 6 also focused attention on disparate exchange practices for dealing with major price movements and other unusual trading conditions. One of these is the NYSE's mechanism for "liquidity replenishment points" ("LRPs"). The NYSE utilizes a hybrid floor/electronic trading model, unlike most other markets today which are fully electronic. There are disagreements regarding whether the one model performed better than another in these circumstances.

Although the ultimate answer to that question requires additional study and analysis, it is useful to describe the effect a certain feature of the NYSE had on market movements that day. In attempting to meld the traditional open-outcry floor-based auction model with today's technology, the NYSE's trading system utilizes what are known as "liquidity replenishment points," or LRPs. LRPs are best thought of as a "speed bump" and are intended to dampen volatility in a given stock by temporarily converting from an automated market to a manual auction market when a price movement of sufficient size is reached. In such a case, trading on the NYSE in that stock will "go slow" and pause for a time period to allow the Designated Market Maker to solicit additional liquidity before returning to an automated market. This "speed bump" occurs even when there may be additional interest beyond the LRP price point.

On days of major market volatility, stocks with significant and continual declines may cause NYSE trading to remain in the "go slow" mode for extended periods or to intermittently return to automated execution status before quickly again hitting another LRP and thereby "going slow" again. Some have suggested that this practice caused a net loss of liquidity as orders were routed to other markets still offering automated executions. Others believe that the LRP mechanism served to attract additional liquidity that helped soak up some of the excess selling interest. We will examine the role and operation of LRPs to assess their effect on overall market quality and intend to promptly finalize this analysis. If any adverse effects on overall market quality are identified, we will take immediate steps to rectify that impact. We are focusing on whether the disparity in exchange practices can be addressed to promote more consistency in how orders are handled in the context of rapidly changing prices without undermining the benefits of individual market practices.

An exchange typically will route an order to another exchange when the other exchange is displaying a better price. The routing exchange does this to avoid "trading through" the other exchange, that is, executing the order at a price worse than is available at the other exchange. When one exchange believes that another exchange is experiencing systems problems, the exchange may declare what is called "self-help" against the other exchange. After declaring "self-help," the declaring exchange may trade through the quotations of the other exchange. The result of a self-help declaration is that the declaring exchange will exclude the quotations of the other exchange from its determination of whether the other exchange has a better "protected" price to which it must route orders for execution. Appendix B provides additional detail on Regulation NMS.

On the afternoon of May 6, just prior to the steep market decline, NASDAQ and NASDAQ OMX BX declared self-help against NYSE Arca, thereby excluding NYSE Arca's quotations (and liquidity) from their routing tables. The NYSE Arca has asserted that it did not experience systems problems that would warrant the declaration of self-help. We are investigating these issues and whether there needs to be greater consistency in exchange practices with respect to the self-help mechanism.

#### **4. Exchange-Traded Funds**

Of the U.S.-listed securities with declines of 60 percent or more away from the 2:40 p.m. transaction prices, which resulted in their trades being cancelled by the exchanges, approximately 70 percent were ETFs. This suggests that ETFs as a class were affected more than any other category of securities.

Based on our analysis to date, we are focused on a number of issues that may have contributed to the ETFs' experience, including:

- Because ETFs generally track securities market indices, the extraordinary price declines in certain individual securities likely contributed to the ETF price declines. For the most part, the severe ETF price declines followed, in time, the sharp decline in the broad markets. ETFs that track bond indices generally did not experience severe price declines. We therefore are reviewing the linkages between ETF price declines and the declines in the equity market.
- The role of market makers and authorized participants in ETFs, and whether an inability to hedge their ETF positions during periods of severe volatility may have contributed to a lack of liquidity in ETF shares.
- The use of ETFs by institutional investors as a way to quickly acquire (or eliminate) broad market exposures and whether this investment strategy led to substantial selling pressure on ETFs as the market began to decline significantly. We also will explore whether the practice of shorting ETFs by institutional investors to effectively eliminate broad market exposures might have contributed to the intraday price swings experienced by certain ETFs.
- The impact of ETF stop loss market orders, particularly from retail investors, on the overall ETF market price declines.
- Given that NYSE Arca is the primary listing exchange for almost all ETFs, whether the impact that the declaration of "self-help" against NYSE Arca by other exchanges may have impacted NYSE Arca-listed stocks generally and ETFs in particular. The loss of access to NYSE Arca's liquidity pool may have had a greater impact on market liquidity and trading for ETFs.

## 5. Other Factors

A variety of other factors likely contributed to or potentially exacerbated the events of May 6. For example, many of the securities that were subject to trade cancellations were thinly-traded, including certain exchange-traded funds and preferred stocks. For such illiquid securities, a large order or influx of orders easily can soak up available liquidity across the market, resulting in an order, particularly if it is a market order, breaking through many price levels in an effort to obtain an execution at any price. A market order is an order to buy or sell a stock at the best available current price. Market orders do not require an execution at a specific price or price range. With market orders, the order submitted generally is assured an execution; however, there is no limit on what the execution price can be. This contrasts with limit orders, which are submitted with a specified limit price. Limit orders guard against executions at prices at which the order submitter is not willing to trade, though the trade-off is that the order may not be executed if the market suddenly moves away from the suggested limit price.

In addition, the effect of market orders on prices may have been further exacerbated on May 6 by the use of stop loss market orders. These orders turn into market orders when the stop price of the order is reached. When an investor places a stop loss market order, the investor is instructing the broker to sell a stock at the market if it falls to a certain price. In a normal market, where liquidity exists as the stock price goes up or down, this strategy can protect an investor from taking a major loss if the stock drops significantly by selling at a predetermined price to minimize the loss. However, on May 6, the use of market orders when stop loss orders were triggered may have led to automated selling that resulted in executions at aberrant prices.

Furthermore, the absurd result of valuable stocks being executed for a penny likely was attributable to the use of a practice called “stub quoting.” When a market order is submitted for a stock, if available liquidity has already been taken out, the market order will seek the next available liquidity, regardless of price. When a market maker’s liquidity has been exhausted, or if it is unwilling to provide liquidity, it may at that time submit what is called a stub quote – for example, an offer to buy a given stock at a penny. A stub quote is essentially a place holder quote because that quote would never – it is thought – be reached. When a market order is seeking liquidity and the only liquidity available is a penny-priced stub quote, the market order, by its terms, will execute against the stub quote. In this respect, automated trading systems will follow their coded logic regardless of outcome, while human involvement likely would have prevented these orders from executing at absurd prices. As noted below, we are reviewing the practice of displaying stub quotes that are never intended to be executed.

Finally, we are examining the effect of short selling during the decline in prices. While short selling did not account for a disproportionate percentage of trading volume over the course of the day, our analysis thus far of broken trades has found that short sales accounted for a very high percentage (70-90 percent) of executions against stub quotes between 2:45 p.m. and 2:55 p.m. Notably, short sale executions against stub

quotes would be subject to the alternative uptick rule (Rule 201) adopted by the SEC in February 2010, with a compliance date in November 2010.

## **6. Initial Steps**

On the Monday following the events of May 6, I met here in Washington with the leaders of six markets - New York Stock Exchange, NASDAQ Stock Market, BATS Exchange, Direct Edge ECN, International Securities Exchange, and Chicago Board Options Exchange - and FINRA, to discuss the causes of market events of May 6, the potential contributing factors, and possible market reforms. The meeting was productive and collaborative, and there was a strong consensus that the type of aberrational volatility experienced on May 6 is wholly unacceptable in our markets.

Earlier this week, the national securities exchanges and FINRA filed proposed rules for uniform market-wide circuit breakers for individual securities in the S&P 500 Index that experience a rapid price movement.

Under the proposed rules, which are subject to Commission approval following the completion of a comment period, trading in a stock would pause across U.S. equity markets for a five-minute period in the event that the stock experiences a 10 percent change in price over the preceding five minutes. The pause would give the markets the opportunity to attract additional liquidity in an affected stock, establish a reasonable market price, and resume trading in a fair and orderly fashion. Initially, if approved, these new rules would be in effect on a pilot basis through Dec. 10, 2010. The markets can use the pilot period to make appropriate adjustments to the parameters or operation of the circuit breaker as warranted based on their experience, and to expand the scope to securities beyond the S&P 500 (including ETFs) as soon as practicable.

The proposed rules are available on the SEC's website as well as the websites of each of the exchanges and FINRA. The Commission is publishing the proposed rules for a 10-day public comment period, and will determine whether to approve them shortly thereafter.

Circuit breakers for individual securities across the exchanges should help to limit significant volatility, promote orderly markets, and bolster investor confidence.

In addition, during the pilot period, I have asked the SEC staff to consider ways to address the risks of market orders and their potential to exacerbate sudden price moves, as well as to consider steps to deter or prohibit the use by market makers of "stub" quotes, which are not intended to indicate actual trading interest. The staff also will study the impact of other trading protocols at the exchanges, including the use of trading pauses by individual exchanges that supplement the market-wide circuit breakers, and "self-help" protocols that allow the markets to avoid routing to exchanges that are perceived to be responding too slowly. The SEC staff also will continue to work with the exchanges and FINRA to improve the process for breaking erroneous trades, by assuring speed and consistency across markets. Another area of review is the need to consider

recalibrating market-wide circuit breakers currently on the books – none of which were triggered on May 6.

As noted above, SEC and CFTC staff recently issued a joint report of preliminary findings regarding the market events of May 6 to the Joint Advisory Committee on Emerging Regulatory Issues. The Committee will hold its first meeting Monday. The Commission looks forward to working with the Committee, whose first charge is to review the market break and make recommendations related to market structure issues that may have contributed to the volatility experienced on that day, as well as disparate trading conventions and rules across various markets.

The following week, on June 2, the Commission will hold a roundtable with various market participants to discuss the structure of the securities markets. In publishing notice of the roundtable in the Federal Register, the Commission has solicited public comment on the current market structure including how well it is serving various market participants. The roundtable will provide an open forum for market professionals, investors, and academics to express their views on the current market structure, possible causes of the unusual trading activity on May 6, and ways to improve the markets to ensure that, first and foremost, our markets are fair and orderly.

Finally, our inspections and enforcement staff also have been fully integrated into our review of the events of May 6. I am deeply concerned about the effects that this volatile market had on investors, especially retail investors whose trading orders may not have behaved as they were intended or who otherwise may have been unfairly harmed. The SEC has received numerous complaints from investors, for example, who used stop loss orders to protect them from rapidly declining markets. It appears that some investors' accounts were liquidated as share prices plummeted only to have stock prices close significantly above their sale prices. We are looking at a wide variety of actions on May 6 involving the full range of market participants. We will examine such things as whether market professionals fully met their obligations, including, where applicable, their best execution obligations, and whether the decision to bust trades was made and applied fairly and consistently among investors. If we identify any activity that violates the securities laws, we will take appropriate action.

### **III. Potential Regulatory Responses**

To the extent there was anything positive in the events of May 6, it was that the markets proved to be resilient and recovered quickly. Nevertheless, such a severe market disruption harms investors and the markets generally. First, it harms those investors who may have traded at erroneous prices. For example, many investors use stop loss orders that are triggered by significant price moves and can liquidate positions at very unfavorable prices. Other investors may see a precipitous price decline and initiate new orders to sell to minimize losses. These new orders likewise may liquidate positions at very unfavorable prices for the investor.

Some of these trades may be cancelled and some may not. But even for trades that are cancelled, they may cause losses for those investors and traders who stepped in and bought during the midst of a severe price decline. These investors and traders accepted the risk of a market meltdown and significant losses, but, if their trades are cancelled, were not rewarded for their willingness to buy when everyone else was selling. Finally and more generally, such disruptive price movements undermine the confidence of investors in the integrity and fairness of our markets, undermining the essential function of supporting capital formation.

In response to the global economic crisis and evolving market practices, the Commission had already undertaken a number of initiatives to strengthen the integrity of our markets, even before the events of May 6. In February, for example, the Commission adopted a short sale circuit breaker. That rule is designed to limit short selling where an individual stock is under stress and has experienced a decline of 10 percent from the previous day's close. At that point, the restrictions of the rule provide assurances to investors that short sellers are not taking the stock down, while retaining the value of short selling in the price discovery process. In so doing, we believe that the rule will promote investor confidence.

The market events of May 6 add greater urgency for the Commission to vigorously pursue a number of meaningful initiatives to promote investor confidence in the integrity and fairness of the securities markets, including a number of proposals already underway. I first will address additional initiatives relating to time out mechanisms, destabilizing short-term trading strategies, and correction of erroneous trades. I will conclude by noting various initiatives already proposed or soon to be considered that may help address disruptive market conditions.

#### **A. New Initiatives**

In January, the Commission published a concept release on equity market structure ("Market Structure Concept Release") that highlighted many aspects of today's highly automated markets and requested public comment on a wide variety of issues. The Market Structure Concept Release was designed to further the Commission's broad review of market structure to assess whether its rules have kept pace with, among other things, changes in trading technology and practices.

The events of May 6 implicate a number of issues raised in the Market Structure Concept Release. For example, it asked whether the current market structure appropriately minimizes the short-term volatility that can be harmful to long-term investors. It asked whether the relatively good performance of the market structure in 2008 indicated that systemic risk was appropriately minimized in the current market structure and, if not, what further steps the Commission should take to address systemic risk. Finally, it noted the dominant role of HFT firms in today's market structure and observed that they had largely replaced the role of specialists and market makers with affirmative and negative obligations for market quality. More specifically, the Market Structure Concept Release asked whether there is any evidence that proprietary firms

increase or reduce the amount of liquidity provided to the market during times of stress. It also discussed various types of short-term trading strategies, including “directional” strategies, such as “momentum ignition,” that could present serious problems in today’s market structure by exacerbating short-term volatility.

The public comment period on the Market Structure Concept Release ended on April 21. The Commission has received more than 100 comment letters reflecting a broad range of perspectives. Many of the letters set forth detailed views on very complex issues, and the Commission continues to review them carefully.

In addition, the Commission has published a series of concrete market structure proposals that are designed to strengthen the U.S. securities markets and to protect investors. These include the proposal to prohibit flash orders and the proposal to increase the transparency of “dark” pools of liquidity, as well as the market access proposal (discussed below) to strengthen broker-dealer risk management controls and the large trader reporting proposal (also discussed below) to enhance the Commission’s surveillance and enforcement capabilities.

The events of May 6 demonstrate the urgency and importance of these efforts and provide a valuable concrete example of how the market structure performed under particularly stressful conditions. As such, they highlight particular regulatory steps that warrant close attention in the near future.

## **1. Destabilizing Short-Term Trading Strategies**

In addition to focusing on liquidity, we must also consider the sources of the selling pressure that can suddenly generate such enormous demand for liquidity to buy. What triggered the selling pressure? What types of market participants were selling and what types of trading strategies were they pursuing?

For example, to what extent, if at all, did the wave of selling on May 6 come from proprietary firms employing “directional” strategies triggered by signals that attempt to exploit short-term price movements? These directional strategies were discussed in the Market Structure Concept Release and include “momentum ignition” strategies that are designed to start and exacerbate price movements. It is too early to know whether short-term professional trading strategies played any role in the events of May 6. If they contributed significantly to the precipitous decline, however, we must consider whether additional regulatory requirements are necessary.

For example, in the past, professional liquidity providers with the best and fastest access to the markets were charged with affirmative and negative obligations to promote market quality. One of the most significant negative obligations was a restriction on “reaching across the market” to take out quotations and thereby drive prices up or down. Many of the most active and sophisticated traders in today’s market structure are not subject to any obligations with respect to the nature of their trading. If active trading

firms exploited their superior trading resources and significantly contributed to the severe price swings on May 6, we must consider whether regulatory action is needed to address the problem.

## **2. Fair and Consistent Process and Policies for Correcting Erroneous Trades**

We also must work with the various exchanges and other trading venues to assure that the process and policies for dealing with the correction of erroneous trades are fair for investors and consistently applied – both in the context of a single event and across different events. Currently, the threshold level for correcting trades is set by the exchanges on a case-by-case basis. The particular level that is chosen may affect investors and other market participants in profound and varying ways. Obviously, the primary objective should be a market structure that minimizes to the greatest extent possible any need to correct erroneous trades. When necessary, however, the process and policies should be applied in a consistent manner under established rules that are fair to investors.

### **B. Ongoing Initiatives**

#### **1. Market Access Proposal**

In January, the Commission proposed a rule that would require effective risk management controls for broker-dealers with market access, including those providing customers sponsored access to the markets. Our proposal would effectively prohibit the growing practice by some broker-dealers of providing “unfiltered” sponsored access, where a customer is permitted to directly access the markets using the broker-dealer’s market participant identifier but without the imposition of effective pre-trade risk management controls. All broker-dealers accessing the markets should implement controls to effectively manage the risks associated with this activity, and our proposal would unequivocally require them to do so. These risks include the potential breach of a credit or capital limit, the submission of erroneous orders as a result of computer malfunction or human error, and the failure to comply with regulatory requirements. Effective risk management controls for market access are necessary to protect the broker-dealer, the markets, the financial system, and ultimately investors. Such controls would help prevent trading activity that could trigger a market disruption. We have received numerous comment letters on our sponsored access proposal and the staff is considering those comments and will soon make a recommendation to the Commission. I expect the Commission to act on this important proposal by this summer.

#### **2. Large Trader Reporting Proposal**

Last month, the Commission proposed to create a large trader reporting system that would enhance our ability to identify large market participants, collect information on their trades, and analyze their trading activity. To keep pace with rapid technological advances that have impacted trading strategies and the ways in which some market

participants trade, the Commission must be able to readily identify large traders operating in the U.S. securities markets, and obtain basic identifying information on each large trader, its accounts, and its affiliates. In addition, to support its regulatory and enforcement activities, the Commission must have a mechanism to track efficiently and obtain promptly trading records on large trader activity.

The current system for collecting transaction data from registered broker-dealers is generally utilized in more narrowly-focused investigations involving trading in particular securities, and is not generally conducive to larger-scale market reconstructions and analyses involving numerous stocks during periods of peak trading volume. In addition, existing tools often require weeks or longer to compile trading data to identify potentially large traders. The Commission's need to develop the tools necessary to readily identify large traders and be able to evaluate their trading activity is heightened by the fact that large traders, including certain high-frequency traders, are playing an increasingly prominent role in the securities markets.

The proposed rule would enhance the Commission's ability to identify those "large trader" market participants that conduct a substantial amount of trading activity in U.S. securities, as measured by volume or market value. In addition, the proposal would facilitate the Commission's ability to obtain from broker-dealers records of large trader activity. By providing the Commission with prompt access to information about large traders and their trading activity, the proposed rule is intended to facilitate the Commission's efforts in reconstructing market activity and performing analyses of trading data, as well as assist in investigations of manipulative, abusive, and other illegal trading activity.

### **3. Consideration of Consolidated Audit Trail Proposal**

One of the challenges we face in recreating the events of May 6 is the reality that the technologies used for market oversight and surveillance have not kept pace with the technology and trading patterns of the rapidly evolving and expanding securities markets. There are mechanisms already in place to coordinate surveillance among markets. For example, the Intermarket Surveillance Group provides a framework for the sharing of information and the coordination of regulatory efforts among exchanges trading securities and related products to address potential intermarket manipulations and trading abuses. However, audit trail requirements vary between markets, resulting in a lack of current, readily accessible securities order and execution data. Today's fast, electronic, and interconnected markets demand a robust consolidated audit trail and execution tracking system.

Since last summer, SEC staff have been working, in consultation with SROs and others, on a rule proposal that would require the SROs to jointly develop, implement and maintain a consolidated order tracking system, or consolidated audit trail. Next week, the Commission will consider this rule proposal, which should result in a continuous reporting mechanism for market participants that would capture the data needed for effective cross-market surveillance. The proposed changes will significantly improve the

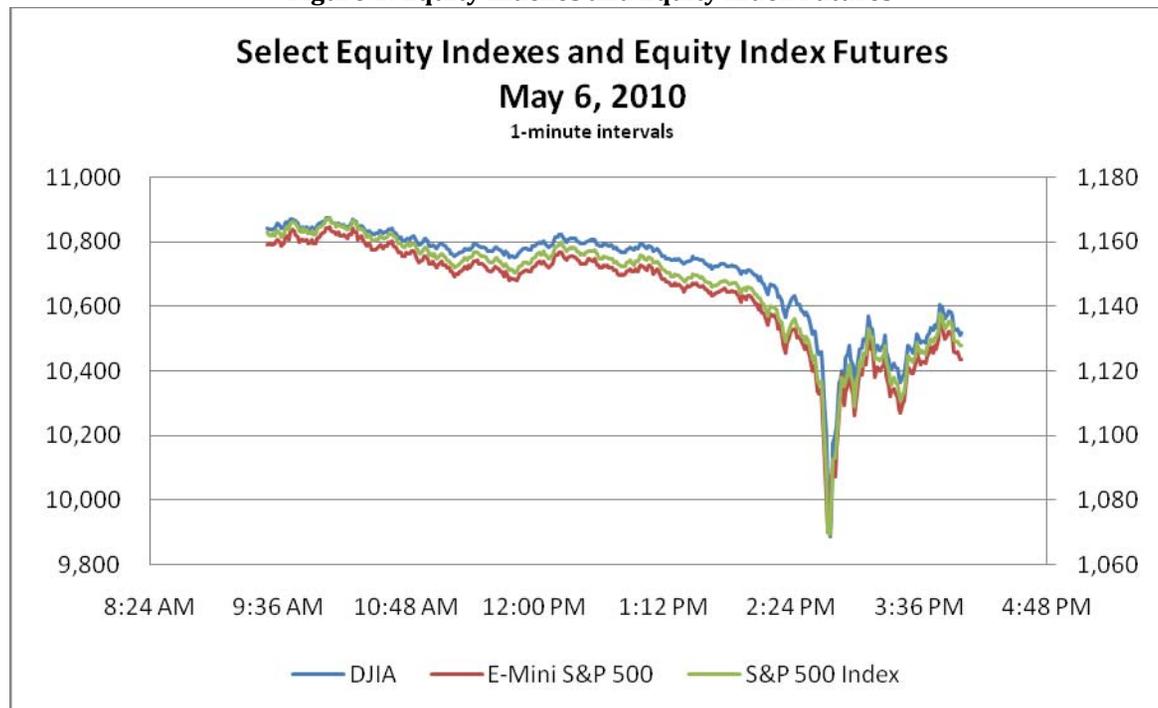
ability to conduct timely and accurate trading analyses for market reconstructions and complex investigations, as well as inspections and examinations. Indeed, I expect that the proposed consolidated audit trail would result in our ability to access in real time the majority of the data needed to reconstruct the type of market disruption that occurred last week, with remaining information available within a matter of days rather than weeks. A consolidated audit trail would be invaluable to enhance the ability to detect and monitor aberrant and illegal activity across multiple markets, and would greatly benefit investors and help to restore trust in the securities markets.

#### **IV. Conclusion**

In conclusion, the events of last week are unacceptable. The SEC is engaging in a comprehensive review and is taking the necessary steps to implement additional safeguards to prevent the type of unusual trading activity that occurred briefly last week. The Commission is considering a number of proposals that will address key issues raised on May 6 and we will move expeditiously to address all issues we determine caused or contributed to those events.

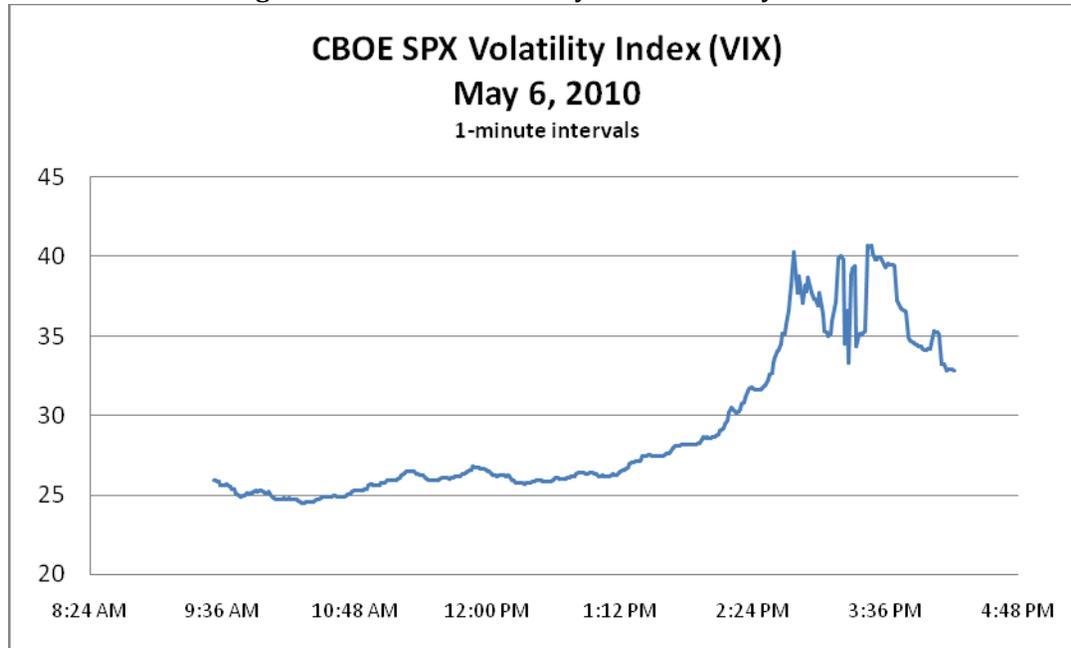
## APPENDIX A

Figure 1: Equity Indexes and Equity Index Futures



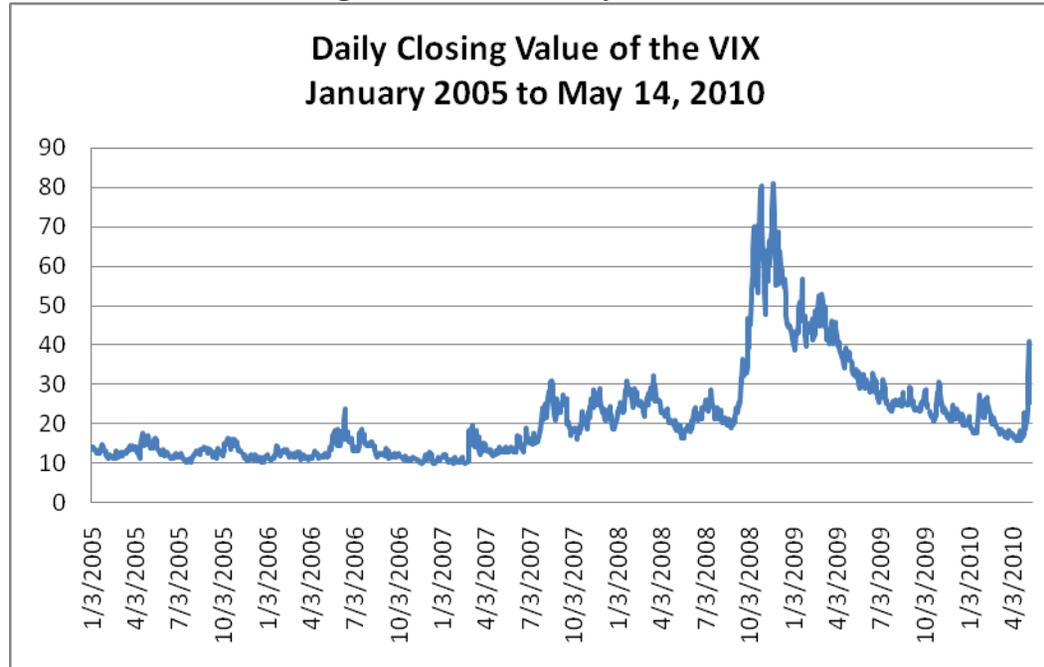
Source: Bloomberg

**Figure 2: CBOE SPX Volatility Index Intraday Levels**



**Source: Bloomberg**

**Figure 3: Historical Daily VIX Values**



**Source: Bloomberg**

## **APPENDIX B**

### **Overview of U.S. Securities Market Structure**

#### **A. The National Market System and Regulation NMS**

In Section 11A of the Securities Exchange Act of 1934 (added to the Act in 1975), Congress directed the Commission to facilitate the establishment of a national market system for securities in accordance with specified findings and objectives. Congress recognized that the securities markets are an important national asset that must be preserved and strengthened, and that new data processing and communications techniques create the opportunity for more efficient and effective market operations. It mandated a national market system composed of multiple competing markets that are linked through technology. A national market system should be contrasted with a structure in which trading is confined to a single trading venue, such as one particular exchange. Congress determined that promoting competition among trading venues and giving as many market makers as possible an opportunity to provide liquidity in stocks would promote greater liquidity and price continuity than a single dominant trading venue.

Over the years, the Commission has sought to keep market structure rules up-to-date with continually changing economic conditions and technology advances. The most recent major updating of the national market system rules occurred in 2005, when the Commission adopted Regulation NMS. Regulation NMS addresses four areas: (1) a “trade-through” rule that prevents the execution of trades at prices that are inferior to a displayed and immediately accessible quotation on another trading venue; (2) an “access” rule that, among other things, promotes private linkages among market participants and trading venues; (3) a “sub-penny” rule that prohibits the display, ranking, or accepting of orders with sub-penny prices; and (4) amendments to the joint-industry plans for collecting and distributing consolidated market data to the public.

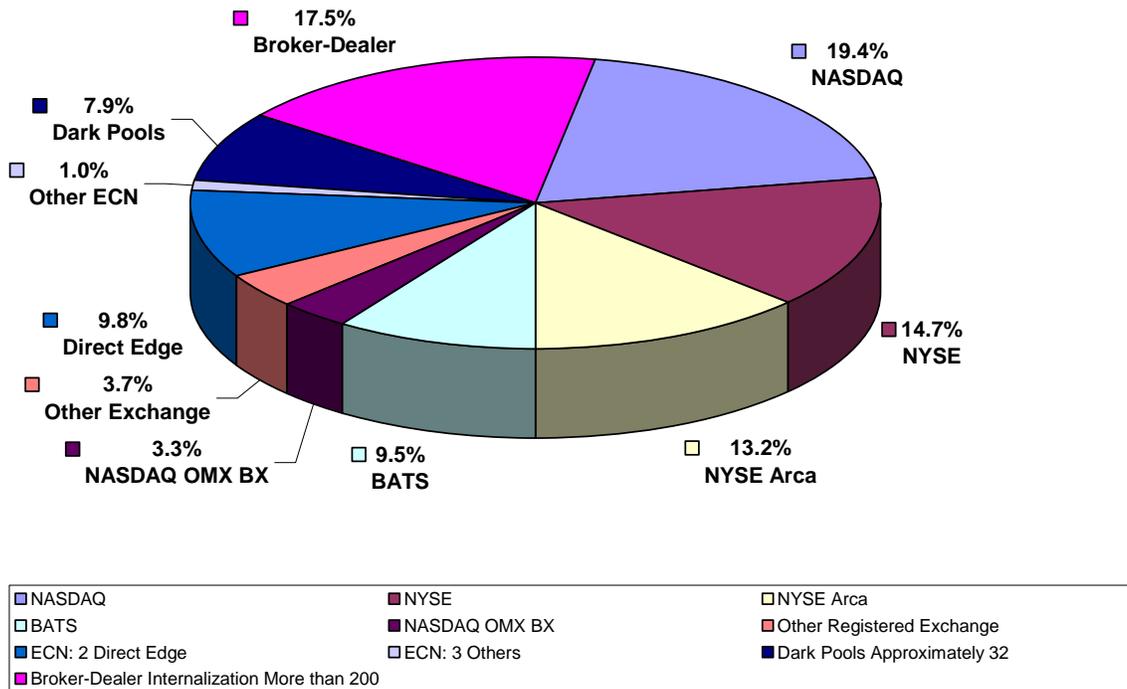
The trade-through rule is probably the most well-known aspect of Regulation NMS and arguably has affected the markets most significantly since it was adopted in 2005. The Regulation NMS trade-through rule eliminated a prior rule that benefited dominant exchanges with trading floors by protecting their manual quotations (that is, orders were required to be routed to the exchange in an attempt to access a manual quotation that could take as long as 10-20 seconds, rather than to another venue with an immediately accessible quotation at an inferior price). To compete under the new regulatory structure, all exchanges developed electronic systems that are capable of providing immediate responses to incoming orders and updating their quotations immediately. These systems enable the exchanges to display quotations that are protected against trade-throughs. Trade-through protection was designed to promote best execution and price stability by preventing one trading venue from ignoring the immediately accessible quotations of another trading venue in a downturn (as well as upturn). The trade-through rule does not protect a trading venue’s quotation if it is not immediately accessible, which, as discussed further below, is the case with the quotations displayed by the NYSE when it hits an LRP.

## B. The Nature of Trading in the Current Market Structure

At least partly as a result of Regulation NMS, trading in U.S.-listed stocks has changed dramatically in recent years. Trading volume now is dispersed among many different trading venues. For example, the share of the New York Stock Exchange in the trading in NYSE-listed stocks declined from 79.1 percent in 2005 to 25.1 percent in 2009. Nevertheless, more than 70 percent of volume continues to be executed by public trading venues that display quotations across a wide range of U.S-listed stocks. Figure 1 below sets forth the major types of trading venues, along with estimates of their trading volume in September 2009:<sup>8</sup>

**Figure 1**

**Trading Centers and Estimated Percentage of Share Volume in NMS Stocks  
September 2009**



<sup>8</sup> Sources of estimated trading volume percentages: NASDAQ; NYSE Group; BATS; Direct Edge; data compiled from Forms ATS for 3d quarter 2009.

The exchanges and other trading venues have adopted highly automated trading systems that can offer extremely high-speed, or “low-latency,” order responses and executions. The average response times at some exchanges, for example, have been reduced to less than 1 millisecond. Many exchanges also offer individual data feeds that deliver information concerning their orders and trades directly to customers. To further increase speed in transmitting market data and order messages, many exchanges also offer co-location services that enable exchange customers to place their servers in close proximity to the exchange’s matching engine.

Highly automated trading systems have helped enable a business model for a new type of professional liquidity provider that is distinct from the more traditional exchange specialist and over-the-counter (“OTC”) market maker. In particular, proprietary traders now use high speed systems by submitting large numbers of orders that can result in more than 1 million trades per day by a single firm. These proprietary traders often are labeled as engaging in high-frequency trading (“HFT”), though the term does not have a settled definition and may encompass a variety of strategies in addition to passive market making.

HFT traders can be organized in a variety of ways, including as a proprietary trading firm (which may or may not be a registered broker-dealer and member of FINRA), as the proprietary trading desk of a multi-service broker-dealer, or as a hedge fund (all of which are referred to hereinafter collectively as a “proprietary firm”). Other characteristics often attributed to proprietary firms engaged in HFT are: (1) the use of extraordinarily high-speed and sophisticated computer programs for generating, routing, and executing orders; (2) use of co-location services and individual data feeds offered by exchanges and others to minimize network and other types of latencies; (3) very short time-frames for establishing and liquidating positions; (4) the submission of numerous orders that are cancelled shortly after submission; and (5) ending the trading day in as close to a flat position as possible (that is, not carrying significant, unhedged positions over-night). Given the competitive pressures to maximize their speed of trading, HFT firms typically will attempt to streamline the code for their trading algorithms. However, every check and filter in that code reduces its speed, creating a tension.

HFT is one of the most significant market structure developments in recent years. Estimates of HFT volume in the equity markets vary widely, though they often are 50 percent of total volume or higher. By any measure, HFT is a dominant component of the current market structure and is likely to affect nearly all aspects of its performance.

### **C. Intermarket Circuit Breakers and Time Out Mechanisms of Individual Trading Venues**

One aspect of the current market structure that pre-dates Regulation NMS is the intermarket circuit breakers that apply across all trading venues in the national market system. The only intermarket circuit breakers for stocks are established in NYSE Rule 80B, though all securities trading venues have agreed to halt trading in accordance with the provisions of NYSE Rule 80B. In addition, the futures markets have agreed to halt

trading in equity securities-related futures in accordance with the provisions of NYSE Rule 80B.

Rule 80B establishes a very broad mechanism that is based on the 30 stocks of the DJIA. It is not currently triggered by the trading in any individual stock. The numerical triggers for NYSE Rule 80B last were updated in 1998 and apply at three levels of price decline – 10 percent, 20 percent, and 30 percent. The first triggering point is a 10 percent decline in the DJIA from its closing value on the previous trading day. If the decline occurs before 2:00 p.m. Eastern time, all trading venues will halt trading for one hour in all stocks, security options, and securities-related futures. If the decline occurs between 2:00 p.m. and 2:30 p.m., trading is halted for 30 minutes. If the 10 percent decline occurs after 2:30 p.m., trading is not halted unless a decline reaches the second level of 20 percent.

If a decline reaches 20 percent before 1:00 p.m., trading is halted for two hours. If it occurs between 1:00 p.m. and 2:00 p.m., trading is halted for one hour. If a 20 percent decline occurs after 2:00 p.m., trading is halted for the remainder of the day. Finally, if a decline in the value of the DJIA reaches 30 percent at any time, trading is halted for the rest of the day.

Notably, none of the NYSE Rule 80B thresholds was triggered on May 6, despite the severe disruption in trading in many stocks. This issue is addressed below in the context of potential regulatory initiatives to prevent severe market disruptions in the future.

Separate and apart from the intermarket circuit breakers established in NYSE Rule 80B, trading venues can establish their own “time out” mechanisms designed to address significant price movements. These time out mechanisms can be more (but not less) restrictive than those in NYSE Rule 80B. An example of such a time out mechanism is the LRP mechanism established solely for the NYSE by its Rule 1000. The LRP mechanism applies at the level of individual stocks, and the thresholds for triggering the mechanism vary by type of stock. In general, however, an LRP is triggered by price declines in the range of 1-3 percent that occur within a 30-second time period. When triggered, the NYSE will display a “non-firm” quotation that cannot be accessed by incoming orders and therefore is not protected against trade-throughs by other trading venues. In the particular case of price declines, trading venues are entitled to trade at prices lower than the NYSE’s non-firm bid quotation during an LRP mechanism. During the LRP mechanism, the NYSE’s Designated Market Maker for a stock attempts to solicit additional liquidity before returning the NYSE to an automated market.

#### **D. Automated Trading and Severe Market Disruptions**

It is important to recognize that severe market disruptions in the form of precipitous price declines are not exclusively associated with automated trading. Disruptions are caused by a glut of sellers willing to trade at any price, combined with the near or total absence of buyers at a particular instant in time (who may themselves be

influenced by the wave of sell orders crashing on the market). In these circumstances, prices can decline precipitously, as they did in many stocks on May 6.

Severe market disruptions have occurred throughout financial market history in a wide variety of market structures. For example, the U.S. equities markets declined by 22.6 percent on October 19, 1987 in a market structure that was dominated by a single manual trading venue. More recently, of course, and particularly since the implementation of Regulation NMS, the U.S.-listed equity markets have become much more automated and much faster. Nevertheless, they generally were able to continue operating smoothly even through the global financial crisis that reached a peak during the autumn of 2008. Accordingly, the inability of the equity markets to maintain fair and orderly trading in many stocks on May 6 is profoundly disappointing and troubling.