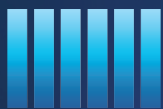
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Strengthening U.S. equity market structure to better address extreme volatility



NYSE

January 28, 2016



Contents

1. Executive summary: Recommendations and enhancements	3
<hr/>	
2. Introduction	6
<hr/>	
3. Challenges in volatile markets	9
<hr/>	
4. Potential solutions	19
<i>Immediate priorities</i>	19
<i>Solutions to be evaluated further</i>	24
<i>Solutions that could carry significant unintended consequences</i>	28
<hr/>	
5. Actions taken by NYSE Group	32
<i>New York Stock Exchange enhancements</i>	32
<i>NYSE Arca enhancements</i>	33
<hr/>	
6. Conclusion	34
<hr/>	
7. Appendix	36

Executive summary:

1

Recommendations and Enhancements

As the market leader in both equity and Exchange-Traded Product (ETP)¹ listings and trading, the New York Stock Exchange (NYSE) is committed to ensuring the continued success and growth of the U.S. markets, and believes that review and enhancements to market structure are essential to market stability and soundness, and important to investor confidence in the functioning of the world's largest equities markets. To that end, and in light of the significant market volatility and related trading events encountered on August 24, 2015, NYSE recently completed an initial assessment to identify opportunities for the Exchange, and the larger equity and ETP trading industry, to improve the market structure and ecosystem that support daily liquidity and trading.

As part of this assessment, in addition to data analysis and conversations undertaken directly with market participants, NYSE retained McKinsey & Company (McKinsey) to supplement its own

research on the events of August 24. McKinsey conducted interviews with a number of market participants, including market makers, liquidity providers, broker-dealers, and issuers and queried interviewees regarding a range of potential solutions that had been proposed publicly or during interviews. In addition, McKinsey researched the experiences of market participants and other exchanges.

In response to these analyses and interviews, NYSE has identified and prioritized five primary actions designed to improve the stability of the equity and ETP markets in adverse market environments, while maintaining the efficiency of trading. In addition, we have identified other solutions that require further evaluation as part of the process of continuously improving the functioning of the U.S. markets. While not summarized below, we also review some proposed solutions later in the report that NYSE does not recommend or support.

¹ The ETP category includes Exchange-Traded Funds, Exchange-Traded Notes, and other related instruments

Immediate Priorities

- Changes to Limit Up/Limit Down (LULD) procedures, including:
 - Adjusting double-wide bands to allow for smoother recovery after price dislocation
 - Extending trading halts to clear order imbalances before re-opening the security
 - Consolidation of all eligible trading interest into the re-opening auction during a LULD halt
 - Harmonization of LULD re-opening auction procedures including collars, liquidity aggregation, and handling of imbalances
 - Actions to ensure price bands are in effect when a security re-opens following a halt
 - Synchronization of Clearly Erroneous Execution (CEE) rules and LULD bands
 - Potential guardrails (such as additional order warnings and pre-identified limits) around market and stop-loss orders
 - A renewed effort to promote increased education among all market participants
-

Solutions to be evaluated further

- Extension of the LULD Limit State beyond 15 seconds before a security enters a halt
 - Additional Market Wide Circuit Breakers based on the number of halted securities
 - Ensuring appropriate incentives for market makers who assume increased obligations to provide liquidity
 - Regulation SHO exemptions for bona fide market-making in support of hedging transactions
 - Review of LULD percentage band tier categories for all securities
 - Alignment of halt procedures among equities, ETPs and futures
-

Simultaneously, NYSE is taking unilateral action where appropriate to ensure continued strength of

its trading venues. All of the following enhancements are in progress or have already been implemented:

New York Stock Exchange enhancements

- Dissemination of order imbalance information until a security opens
- Improving transparency of pre-opening indications on volatile days
- Enhancing automated opening procedures to open stocks more efficiently on volatile days
- Discontinuing acceptance of stop-loss orders

NYSE Arca enhancements

- Wider market collars for the initial opening auction
- Wider market collars for re-opening auctions
- Automatic extension of trading halts in case of substantial order imbalances
- Ensuring LULD price bands have been received from the central Securities Information Processor (SIP) before resuming trading

Collectively, these solutions will give participants more confidence that their orders will be appropriately executed during periods of heightened volatility, as well as provide the marketplace with greater transparency in cases where halts occur. Further, proactive measures to help protect retail investors will encourage more informed usage of orders without price limits, specifically market orders and stop-loss orders.

Several of these solutions will entail a multi-step process rather than a quick fix. However, we believe the outcome will be worth the effort in each case, as structural changes along with increased preparedness of market participants will result in increased available liquidity, reduced severity of price dislocations, and a better outcome for all investors.

A background image showing two hands, one from the top right and one from the bottom left, holding a globe. The hands are positioned as if supporting the globe from above and below. The background is a soft, out-of-focus landscape with tall grasses under a clear sky.

2 Introduction

The U.S. equity and Exchange-Traded Product markets have experienced sustained growth over the past decade, as trading costs and management fees have dropped, resulting in an improved experience for investors. Overall, investors are paying less in transactions costs and fund management fees as many broker-dealers continue to offer commission free trades; for example, the asset-weighted expense ratio across all funds was 0.64% in 2014, down from 0.76% in 2009². Total market capitalization of U.S.-listed domestic companies grew from \$16.9 trillion in 2005 to \$24.9 trillion in 2015³, while U.S. ETP assets have grown from \$237 billion in 2004 to over \$2 trillion in 2015⁴. Equity market structure has also been enhanced in recent years with developments such as new risk controls and price validations implemented by broker-dealers pursuant to the SEC's Market Access Rule⁵ and the Limit Up/Limit Down and Market-Wide Circuit Breaker mechanisms implemented by all U.S. equity markets to better protect investors from adverse executions during periods of heightened volatility.

Despite this progress, the rapid market selloff and related events on the morning of August 24, 2015 have highlighted the need to further strengthen the operation of U.S. equity markets when price dislocations occur⁶. Major market-wide events afford market participants an opportunity to assess the real-world performance of new features and mechanisms introduced as market structure has evolved, and to collaborate to introduce enhancements designed to further streamline the

functioning of the U.S. markets—a goal shared by exchanges, investors, listed company and ETP issuers, and market makers. As such, the morning of August 24 provided the industry with its first opportunity to observe how market protections implemented in recent years behave during times of significant stress.

NYSE has identified the following take-aways from the events on August 24, each discussed in more detail throughout this report:

- **Large numbers of retail market orders were sent to exchanges in the morning, contributing to selling pressure:** Between 9:30 and 10:00 a.m. ET on August 24, NYSE saw a six-fold increase in executed market order volume compared to July levels. NYSE Arca experienced an even greater proportional increase in market orders for ETPs. A significant number of market orders were sent by retail wholesalers (i.e., firms who accept order flow from individual brokerages and either execute them, or route them to other trading centers for execution), and many of these orders appear to have been the result of triggered “stop-loss” orders, which automatically convert into market orders when a specified price is reached.
- **Current market structure reduced the ability of market makers to provide liquidity during the selloff:** Increased market orders to sell coincided with significant declines in liquidity

2 Including mutual funds and ETPs, and excluding money market funds and funds of funds. Morningstar: 2015 Fee Study: “Investors Are Driving Expense Ratios Down” [news.morningstar.com/pdfs/2015_fee_study.pdf](https://www.morningstar.com/pdfs/2015_fee_study.pdf)

3 Investment Company Institute, World Federation of Exchanges and World Bank, DataBank, “Market capitalization of listed domestic companies”: data.worldbank.org/indicator/CM.MKT.LCAP.CD

4 BlackRock, “Global ETP Landscape, Industry Highlights”, September 2015; Investment Company Institute

5 Securities and Exchange Act Rule 15c3-5. See www.sec.gov/rules/final/2010/34-63241.pdf

6 Table 1 and Table 2 in the Appendix provide more details on the events of August 24, 2015 and May 6, 2010 (“Flash Crash”)

across most stocks and ETPs, including the most actively traded securities. Compared to July levels, liquidity provision on August 24, as measured by consolidated size at the National Best Bid and Offer (NBBO), declined 35% in the top 100 NYSE stocks, 50% in the top 100 NASDAQ stocks, and around 80% in two of the most liquid ETFs, SPY and QQQ. Many market makers interviewed by NYSE expressed that they would have preferred to provide more liquidity (i.e., buy more aggressively, thereby supporting market prices) during the selloff, but that they were restricted from doing so by one or more systematic risk control or market structure constraints. Among the factors cited as adversely impacting the ability of market makers to provide liquidity were the triggering of Limit States in both S&P 500 and Nasdaq 100 futures as the securities markets opened, fears that a market-wide circuit breaker (MWCB) would be triggered, concerns that certain trades would be broken in an unpredictable manner under Clearly Erroneous Execution (CEE) rules, a significant number of short sale restrictions, reduced hedging opportunities, each firm's automated market maker risk limits as required by the SEC Market Access Rule, and a significant number of Limit Up/Limit Down trading pauses that prevented trading/hedging in various correlated securities.

- **The Limit Up/Limit Down trading pause mechanism helped to slow trading during the selloff, but with unintended consequences due to broader-market volatility:** While the LULD trading pauses helped protect investors against significant price moves resulting from the pairing of large market sell order activity with reduced contra-side liquidity, the sheer number and rapid-fire nature of LULD-driven halts in the morning reduced transparency and impeded the ability of security prices to

quickly rebound and normalize.

- **ETP prices temporarily decoupled from those of their component securities due to frequent halts and reduced liquidity provision:** Many ETPs, particularly those holding U.S. equities, experienced pricing dislocations during the first two hours of trading. While ETPs holding foreign or fixed-income securities routinely trade in an orderly manner absent real time pricing information, market participants attributed the sometimes-significant swings in ETP prices on August 24, in part, to reduced availability of pricing information for single securities, suggesting that ETPs holding U.S. equities are priced differently by market participants.
- **Certain opening and re-opening procedures hindered timely and transparent openings:** NYSE Arca's auction market collars for ETPs, which protect investors from adverse price moves due to brief supply/demand imbalances or "fat-finger" errors, were perceived to have the side-effect of constraining some investors' ability to participate in opens and re-opens due to substantial market order imbalances. The New York Stock Exchange's unique market model combines leading technology with human judgment to prioritize price discovery and stability to maintain orderly trading. Specifically, the NYSE Designated Market Makers (DMM) operate both manually and electronically to facilitate price discovery during market opens, closes and during periods of trading imbalances or instability. On the NYSE, given the significant market order activity and concentration of order flow at the open, stocks took longer to open than usual. That said, as part of the NYSE opening process, NYSE DMM's committed six times more capital than normal⁷, which helped to stabilize prices, and the longer-

⁷ NYSE data

than-usual opening process appeared to be, at most, a secondary factor impacting ETP pricing⁸. In general, NYSE believes that harmonization of trading rules and procedures that impact trading during highly volatile periods should be an important goal for all exchanges, as discussed in more detail below.

About NYSE Group

NYSE Group, an Intercontinental Exchange company (NYSE: ICE), is the premier operator of capital markets and exchanges in the United States. Among its other business, NYSE Group operates three U.S. equities exchanges:

- **The New York Stock Exchange**, the listing venue for today's leading large- and medium-sized companies with a listed community of more than 2,400 companies. (Throughout this report, when referring to an exchange, "NYSE" refers specifically to the New York Stock Exchange market.)
- **NYSE Arca**, an all-electronic market and the largest listing venue for Exchange-Traded Products in the U.S., with over 1,550 total ETP listings, representing more than 93% of ETP assets under management in the U.S.
- **NYSE MKT**, a listing venue designed to support younger, high-growth companies that fit into the small-cap category.

⁸ For example, the second-most-actively traded ETP on August 24, QQQ, traded at a substantial discount to its NAV until 9:37, but includes only Nasdaq-listed stocks, all of which opened at exactly 9:30
Source: SEC Report on Equity Market Volatility on August 24, 2015
www.sec.gov/marketstructure/research/equity_market_volatility.pdf

3 Challenges in volatile markets

Our analysis of the events of August 24 highlights the following challenges that can surface under similar conditions of extreme volatility:

Large numbers of retail market and stop-loss orders sent to exchanges in the morning

Pre-market trading: By the time the securities markets opened for the regular trading session on August 24, pre-market trading, at more than three

times normal levels, had already made it clear that volatility would be exceptionally high. Pre-market activity was particularly high in NYSE Arca-listed ETPs and Nasdaq-listed securities (see Table 3). This unusual amount of volume pushed down prices in many securities, with 366 or nearly 5% of all securities experiencing their daily price lows during pre-market hours.

Table 3 Comparison of average daily volume in July 2015 to August 24 in Tape A, B, and C securities

Average daily volume in 30 minute increments

	Tape A			Tape B			Tape C			All US equities		
	July	Aug. 24	Ratio	July	Aug. 24	Ratio	July	Aug. 24	Ratio	July	Aug. 24	Ratio
Pre-market	16,311,573	32,866,072	2.0	19,306,072	89,237,823	4.6	12,767,725	39,091,123	3.1	48,385,371	161,195,024	3.3
Open	39,918,642	121,747,778	3.0	9,721,296	38,160,499	3.9	20,246,409	55,656,552	2.7	69,886,347	215,564,829	3.1
9:30-10 (ex. Open)	354,519,271	780,524,416	2.2	155,551,759	474,328,291	3.0	209,457,506	479,048,304	2.3	719,528,535	1,733,901,011	2.4
10:29:59	285,895,627	633,769,855	2.2	110,518,175	400,640,440	3.6	158,561,765	339,465,660	2.1	554,975,567	1,373,875,955	2.5
10:59:59	261,479,924	485,662,993	1.9	104,772,639	318,485,896	3.0	139,104,766	262,403,658	1.9	505,357,329	1,066,552,547	2.1
11:29:59	231,697,358	386,697,087	1.7	86,923,506	213,556,185	2.5	120,774,574	187,795,218	1.6	439,395,438	788,048,490	1.8
11:59:59	203,277,959	380,749,462	1.9	75,629,352	240,066,390	3.2	106,002,410	211,595,422	2.0	384,909,721	832,411,274	2.2
12:29:59	172,705,078	348,776,110	2.0	64,423,586	219,669,386	3.4	90,862,738	194,602,673	2.1	327,991,402	763,048,169	2.3
12:59:59	163,677,789	295,448,533	1.8	62,354,977	182,484,868	2.9	85,779,405	163,927,198	1.9	311,812,170	641,860,599	2.1
13:29:59	165,307,026	246,268,233	1.5	61,918,672	153,832,571	2.5	86,638,846	133,931,321	1.5	313,864,543	534,032,125	1.7
13:59:59	171,153,552	275,883,264	1.6	61,010,775	182,971,855	3.0	89,342,659	150,351,956	1.7	321,506,986	609,206,075	1.9
14:29:59	190,976,496	325,518,655	1.7	77,066,389	220,325,443	2.9	97,291,942	173,796,526	1.8	365,334,828	719,640,624	2.0
14:59:59	210,227,433	387,841,751	1.8	78,854,006	238,254,430	3.0	107,324,425	187,748,320	1.7	396,405,863	813,844,501	2.1
15:29:59	258,524,751	569,701,914	2.2	89,823,416	329,571,807	3.7	128,239,237	282,807,934	2.2	476,587,404	1,182,091,655	2.5
15:59:59	578,197,167	1,009,297,626	1.7	169,237,301	475,997,872	2.8	282,581,799	484,873,826	1.7	1,030,016,200	1,970,169,321	1.9
Close	162,549,879	256,609,143	1.6	41,261,686	109,120,848	2.6	71,622,880	108,154,685	1.5	275,434,445	473,884,676	1.7
Post-market	69,357,849	97,336,338	1.4	65,246,315	168,884,773	2.6	46,588,578	55,738,873	1.2	181,198,742	321,959,984	1.8
Total	3,535,777,374	6,634,699,230	1.9	1,333,619,920	4,055,598,383	3.0	1,853,187,597	3,510,989,246	1.9	6,722,584,891	14,201,286,859	2.1

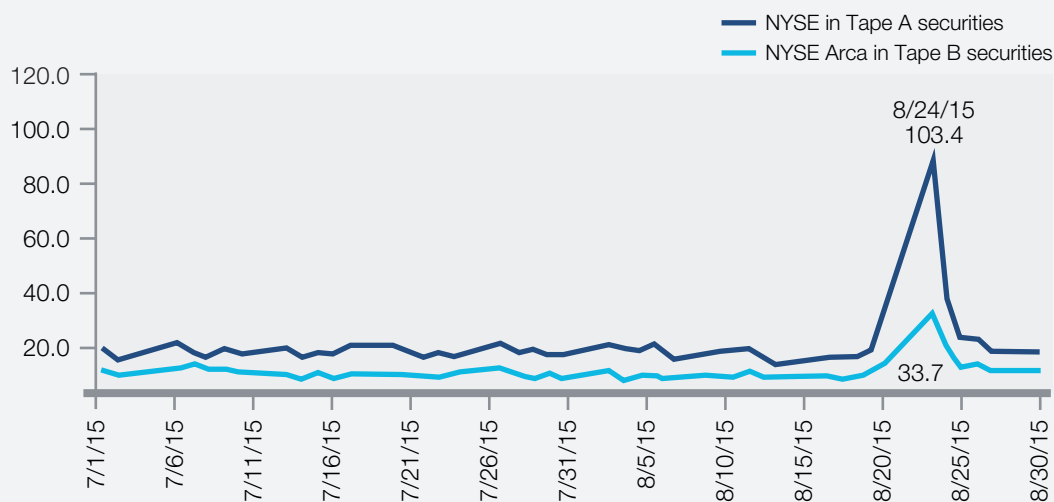
SOURCE: Consolidated Tape

The first 30 minutes: NYSE and NYSE Arca saw a significant increase in market orders on August 24 (see Exhibit 1), with most of the activity coming in the first half hour of trading. Between 9:30 and 10:00 a.m., market orders on the NYSE accounted for 6.5 times more shares traded than the average

in July. Similarly, in ETPs on NYSE Arca, market order volume was 7.7 times higher than July levels. Additionally, off-exchange trading share reported to the Trade Reporting Facility (TRF) was particularly low in the early morning as retail wholesalers routed more market orders to exchanges (see Exhibit 2).

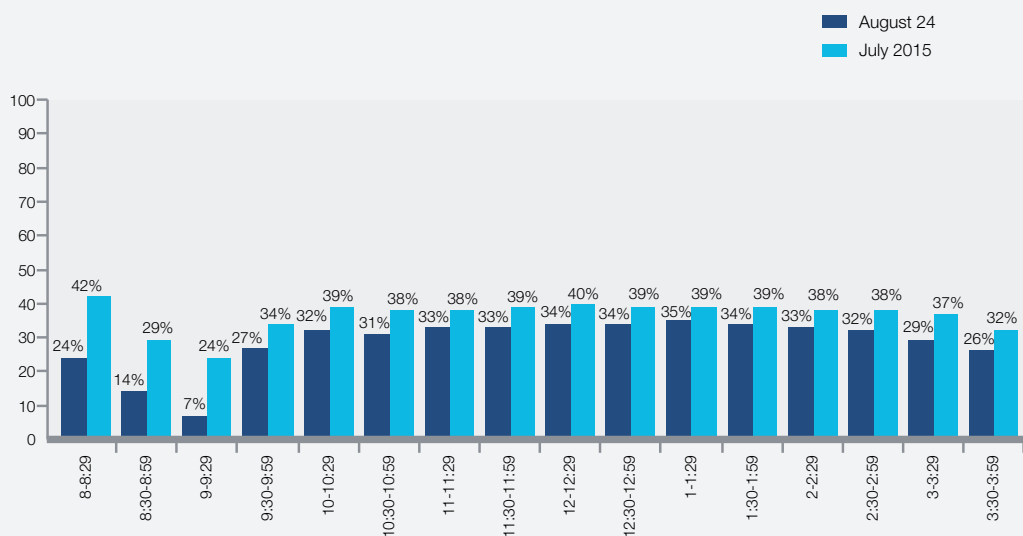
Exhibit 1 Executed volume of market orders

Millions/shares



SOURCE: NYSE, NYSE Arca, NYSE data

Exhibit 2 Off-exchange market share sent to trade reporting facility



SOURCE: Consolidated Tape

Role of stop-loss orders: NYSE also saw a significant increase in stop-loss orders, which converted to market orders as a result of the fast falling market and thereby contributed to the selling pressure (by design, stop-loss orders are automatically converted to market orders when the given stop price is reached). NYSE Arca does not accept stop-loss orders, but many broker-dealers accept these orders for execution on any exchange and automatically convert them to market orders once an order's specified price level is triggered. Accordingly, it is likely that many market orders seen on NYSE Arca originated as investor stop-loss orders before being automatically converted by a broker-dealer.

Size of opening auction: The high number of market orders contributed to opening auction volume across markets that was three times higher on August 24 than the average in July (see Table 3). The need to supply liquidity to execute market orders was a contributing factor to the NYSE Designated Market Makers' (DMMs) commitment of capital during the opening auction on August 24 of 6.4 times more than their typical dollar value. (NYSE is the only exchange to guarantee an execution in the opening transaction for market and market-on-open orders. DMMs assigned to each security are required to supply

liquidity as needed to minimize the effects of any temporary disparity between supply and demand.)

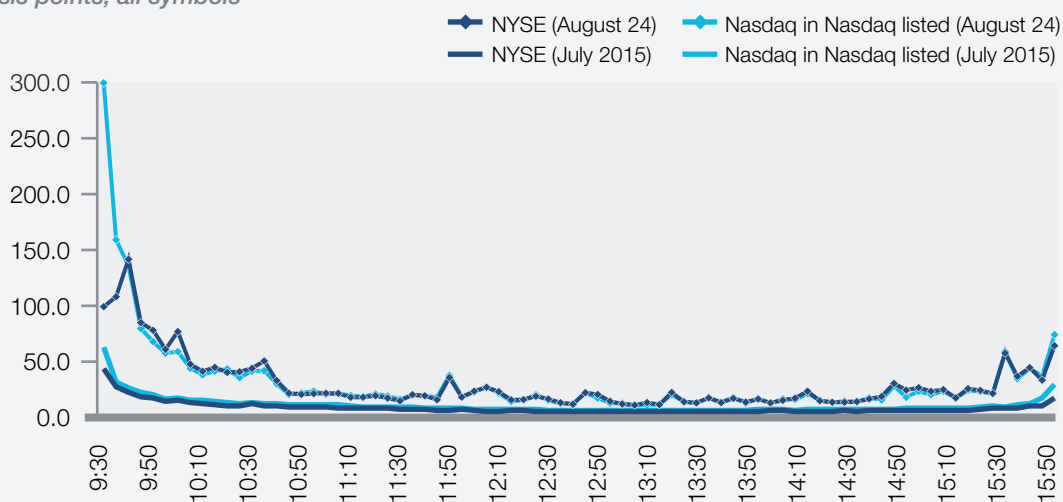
Volatility led to reduced liquidity provision by market makers

On a typical day, volatility is the greatest during the first hour of trading, as participants digest overnight news. Volatility (measured in 5-minute trading ranges) was at elevated levels during the first hour of trading on August 24 (see Exhibit 3), which contributed to the challenging trading environment and adversely impacted liquidity provision.

Responding to the volatile markets on August 24, many electronic liquidity providers appear to have reduced the liquidity they provided across markets for most stocks and ETPs, including the most active securities (see Table 4). For example, the single most actively traded NYSE and Nasdaq-listed stocks each experienced a decline of greater than 50% in displayed liquidity at the National Best Bid and Offer (NBBO) on August 24 compared to the average in July. In general, increased market order selling coincided with significant declines in liquidity across most stocks and ETPs, including the most active securities.

Exhibit 3 Average five minute trading range

Basis points, all symbols



SOURCE: Consolidated Tape, NYSE

Table 4 Consolidated quoted share size at NBBO – July vs. August 24

		July	Aug. 24	July vs. Aug. 24 change
NYSE-listed stocks: top 5 most active	BAC	278,540	108,329	-61%
	T	37,846	12,059	-68%
	VALE	118,833	111,460	-6%
	PBR	84,927	107,888	27%
	F	104,110	67,645	-35%
	Top 100	38,565	25,015	-35%
Nasdaq-listed stocks: top 5 most active	AAPL	3,069	1,415	-54%
	MU	14,752	5,462	-63%
	INTC	23,172	8,877	-62%
	FB	2,188	1,428	-35%
	MSFT	10,735	3,670	-66%
	Top 100	24,926	12,495	-50%
ETFs: top 5 most active	SPY	23,316	4,978	-79%
	UWTI	1,599,045	134,451	-92%
	VXX	35,341	4,107	-88%
	GDX	76,694	28,669	-63%
	EEM	222,346	66,401	-70%
	Top 100	94,580	49,689	-47%

SOURCE: Consolidated Tape

Like individual stocks, the most actively-traded ETPs experienced less displayed liquidity on August 24, highlighting the linkages between the instruments. Certain ETPs may ordinarily have less depth-of-book liquidity compared to corporate stocks, and the early-morning surge in market orders on August 24 overwhelmed the available top-of-book liquidity in many instances, resulting in price swings and causing LULD trading pauses.

Market makers reduced liquidity provision during the morning of August 24 for many reasons:

- Reduced liquidity in the underlying components of ETPs, impacting market-makers' ability to hedge
- Both S&P 500 futures and Nasdaq 100 futures were down significantly and in a limit state as the

equity markets opened

- Because the S&P 500 Index was trading near the 7% down threshold, concerns arose that a market-wide circuit-breaker halt would be triggered, possibly obliging market makers to hold positions for an unexpectedly long period
- Concerns that aggressive liquidity provision could result in broken trades under the CEE rules⁹
- Extended opening processes for individual securities and limited opening imbalance information may have interfered with market makers' ability to price correlated assets
- The proliferation of LULD halts for single stocks added to difficulties pricing ETP portfolios,

⁹ For example, a market maker willing to buy an ETP during the early selloff might have purchased 100 shares for 96.00 and later sold 100 shares at 96.10. If the original purchase is later busted when the ETP was trading at 103.00, but the sale stood, a small realized profit would have turned into a large mark-to-market loss. Market makers advised us that they price the risk of such trade busts into their trading decisions during periods of price dislocation. (In the event, very few trades were actually busted on August 24.)

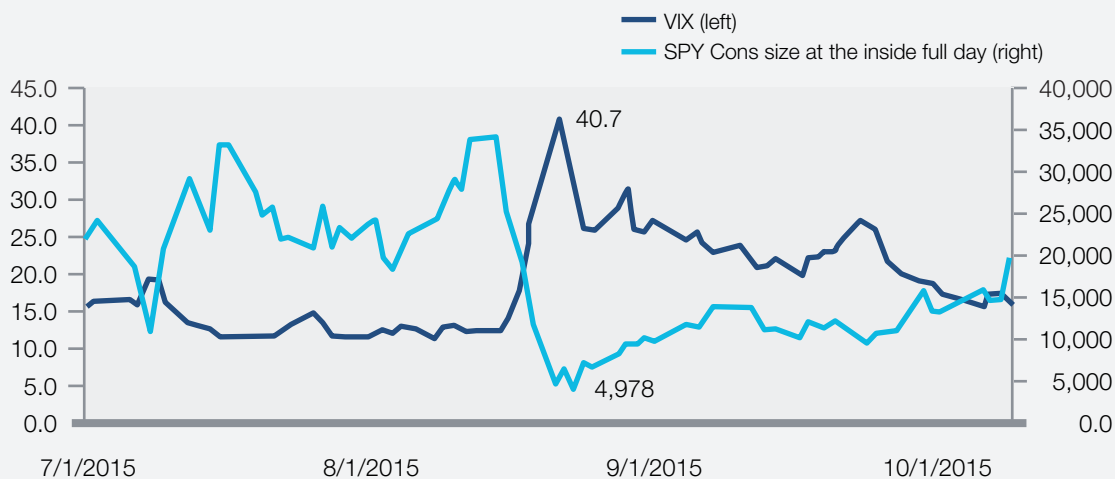
influencing decisions for certain participants to withdraw from trading

- The triggering of broker-dealer market access risk limits prevented some market makers from entering additional liquidity into the market without manual intervention to override risk thresholds required by SEC rules¹⁰
- A high number of securities with short sale restrictions hindered ETP market makers ability to hedge and provide more liquid markets (Regulation SHO short sale restrictions triggered in more than 2,000 securities, mostly before 9:45 a.m.¹¹)
- “Fail-safes” in automated market-making systems likely interpreted signals of extreme pricing conditions as errors in data feeds or other systems (in line with generally-accepted

automated trading system best practices), causing market-makers to exit the market for a short period until pricing could be confirmed¹²

Exhibits 4 and 5 highlight the erosion in liquidity in SPY and QQQ as volatility increased in August. On August 24, top-of-book liquidity in both SPY and QQQ was nearly 80% less than July levels. The QQQ experienced significant liquidity strains despite all underlying stocks being opened at 9:30, highlighting that the early-morning absence of liquidity can be attributed to factors other than the timing of single-stock openings.

Exhibit 4 SPY – consolidated size at the NBBO and VIX



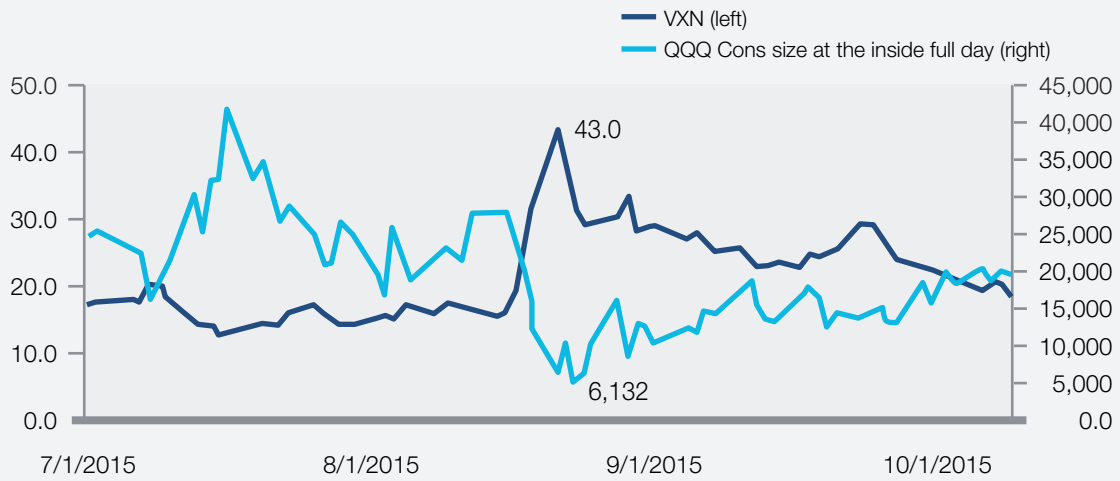
SOURCE: Consolidated Tape, yahoo.com

10 These thresholds are set at market makers’ discretion, but general expectation per SEC rules is that they must be set according to written policies and procedures, or other consistent and systematic means

11 SEC Report on Equity Market Volatility on August 24, 2015

12 For example, an automated market making system calibrated to capture pricing inefficiencies between a given ETP and the related basket of securities that are usually on the order of a few basis points may, in seeing apparent pricing errors an order of magnitude larger than anything seen previously, have shut itself down on the assumption that data feed or calculation errors are more likely than market pricing anomalies of that degree

Exhibit 5 QQQ – consolidated size at the NBBO and VXN

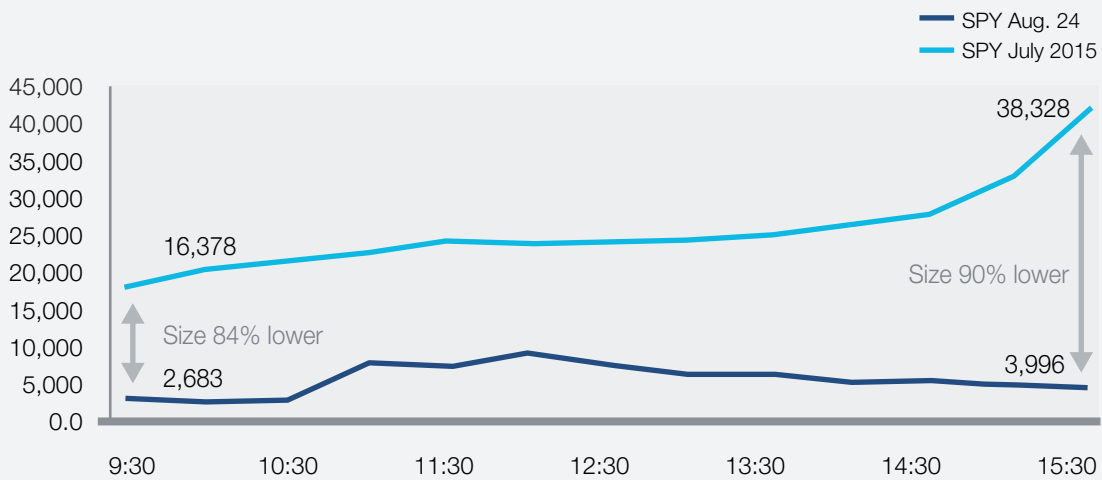


SOURCE: Consolidated Tape, yahoo.com

Exhibits 6 and 7 provide a closer look at liquidity provision in SPY and QQQ on August 24. In both issues, liquidity was particularly low in the first hour

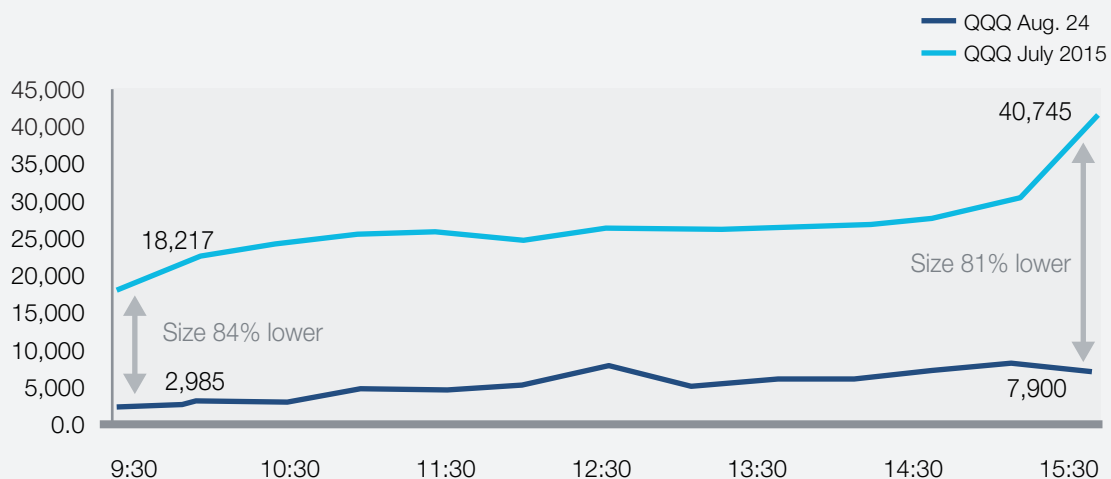
of trading when exchanges were inundated with market orders and remained low throughout the day compared to July levels.

Exhibit 6 SPY – consolidated size at the NBBO



SOURCE: Consolidated Tape

Exhibit 7 QQQ – consolidated size at the NBBO



SOURCE: Consolidated Tape

Less displayed liquidity provision made it more difficult to absorb the excess of market orders and put significant pressure on prices. That day, 657 securities (including 320 ETPs) experienced price

declines of more than 20% from the prior night's close (see Table 5). In many securities, the low prices for the day occurred during the first hour of trading.

Table 5 Price declines on August 24 (low price vs. previous day's close)

Price decline	NYSE-listed	%	Nasdaq-listed ¹	%	ETPs ²	%	Total	%
Over 20%	148	4.5%	189	6.9%	320	19.6%	657	8.6%
10%-20%	708	21.8%	741	26.9%	303	18.6%	1752	22.9%
Under 10%/+	2398	73.7%	1820	66.2%	1010	61.8%	5228	68.5%
Total	3254	100.0%	2750	100.0%	1633	100.0%	7637	100.0%

¹ Excludes ETPs

² ETPs listed on all exchanges

SOURCE: Consolidated Tape

The Limit Up/Limit Down (LULD) trading pause mechanism functioned as designed, but with unintended consequences due to broader-market volatility

Implemented in 2013, the LULD program is a market-wide plan to prevent trades in individual securities from occurring outside of specified price bands, while allowing the security to continue to trade for a short time until prices correct. The LULD program helps to reduce extraordinary volatility in electronic markets by temporarily halting trading in a security if an immediate correction does not occur. It replaced a system of single stock circuit-breakers created in response to the Flash Crash on May 6, 2010. LULD rules are in effect only during regular hours trading from 9:30 a.m. to 4:00 p.m.

For each security, a Reference Price and Percentage Parameter are used to establish lower and upper bands through which trading will not take place. The first Reference Price is either the opening trade price or, if no opening trade, the bid/ask midpoint of the opening quote on the primary listing exchange. After the open, the Reference Price is the average of trade prices taken over the preceding five-minute window. A security will enter a Limit State if the National Best Offer equals the Lower Price Band or the National Best Bid equals the Upper Price Band. A security will exit a Limit State if the entire size of all quotes at the Limit State is executed or cancelled within 15 seconds; if a security does not exit a Limit State within 15 seconds, the primary exchange will declare

a market-wide trading pause that will last for at least 5 minutes.

Securities are classified as Tier 1 (comprising S&P 500 or Russell 1000 constituents and unleveraged ETPs with over \$2 million average daily dollar volume) or Tier 2 (all other National Market System securities). Different price band ranges are applied to Tier 1 and Tier 2 securities. Because market volatility tends to be naturally higher at the start and end of the day, the price bands are doubled during the first 15 and last 25 minutes of regular trading hours for both Tier 1 and Tier 2 securities. For example, a Tier 1 security with a price greater than \$3 has a price band of 5% between 9:45 a.m. and 3:35 p.m. and 10% between 9:30-9:45 a.m. and 3:35-4:00 p.m.

The Limit Up/Limit Down Program on August 24

LULD has been largely successful for single-stock events but had not been tested in a large market-wide event until August 24. On that day, there were a record number of LULD trading pauses: 1,278 (see Table 6), compared to 39 on a typical day. While the LULD mechanism functioned correctly in accordance with Exchange rules, and was likely effective at dampening volatility to some degree, the large number of trading pauses proved problematic for some participants. A vast majority of the halts impacted ETPs with equity component securities and happened in the first hour of trading.

Table 6 Number of LULD halts

	Total	# active over 1M CADV	# less active under 1M CADV
NYSE-listed	78	55	23
Nasdaq-listed (ex. ETPs)	139	3	136
ETPs	1061	44	1017
Total	1278	102	1176

SOURCE: Consolidated tape

NYSE Arca is the primary ETP listing venue in the U.S., with nearly 90% of all issues. As a result, not surprisingly, NYSE Arca-listed ETPs underwent a large number of the LULD halts: 999 LULD halts in 302 symbols. Halts were concentrated in less active securities, and in many instances there were repeated halts in the same security. A total of 79 symbols had 5 or more LULD halts, accounting for 552 of the halts. Most halts were in the first half-hour of trading, including 50 at 9:45, when double-wide bands are designed to instantly narrow.

Questions about the opening Reference Price calculation pre-date August 24, and prior to that date, NYSE Group had already been working with other industry participants on a data-driven review to make improvements to the LULD plan. Participants previously raised concerns around occurrences of LULD trading pauses in thinly-traded securities (mostly ETPs and Nasdaq-listed issues) during the first half-hour of trading due to problems determining a proper opening reference price to establish LULD bands. As a result of these concerns, LULD plan participants recently filed to amend plan rules to provide that, if there is no opening trade in a security, the first reference price is based on the prior day's close instead of the bid/ask midpoint. Analysis showed that changing the reference price in this way could reduce spurious halts by 80-90%. Many halts on August 24 occurred early in the trading session and appear to have been caused by bad reference prices.

Another issue on August 24 was trading immediately after the primary opening and re-opening print that occurred outside the LULD bands. Trades outside the LULD bands can happen because, under current procedures, the central Securities Information Processor (SIP) is responsible for computing and disseminating LULD bands, but exchanges need not wait for the SIP bands before commencing trading. As a result, immediately following an LULD halt resumption, securities can theoretically trade outside the LULD bands for a very brief period (typically measured in milliseconds). In Tape A and

Tape B securities, this occurred across exchanges in 453 symbols accounting for 4,059 trades and 825,489 shares on August 24. This issue could be resolved if exchanges either wait for the LULD bands from the SIP, or exchanges create and use their own "synthetic" bands during this very short period¹³.

LULD plan participants are continuing to work with the SEC on near term improvements which may include a change in the opening reference price when there are no trades, waiting for LULD bands to be implemented before trading immediately after a re-opening auction, narrowing ETP percentage bands for actively traded securities and changing tiers for corporate stocks based on price and volume characteristics.

Other suggestions for improving aspects of the LULD program are discussed in more detail below.

ETP prices temporarily decoupled from those of their component securities due to frequent halts and reduced liquidity provision

There were 217 LULD trading pauses for equities and 1061 LULD trading pauses for ETPs on August 24¹⁴. ETPs linked to international stocks, fixed-income products and other asset classes routinely trade while their constituent securities are not open for trading; however, market participants may be used to pricing ETPs based on U.S. equities from concurrent equities trading prices. Feedback regarding August 24 suggests that market participants' approach to trading ETPs holding U.S. equities is indeed different from that used for other categories of ETPs.

Significant overnight stock price declines in the global markets led to a flood of market orders to sell, in turn leading to low liquidity provision levels and amplified volatility during the first hour of trading – already the most volatile part of the trading day during ordinary trading. Many of the U.S. equity-linked ETPs that traded while some of their constituent securities were halted experienced pricing dislocations during the first

¹³ SEC Report on Equity Market Volatility on August 24, 2015

¹⁴ LULD halts on NYSE, Nasdaq and BATS

two hours of trading; market participants attributed these sometimes-significant swings in ETP prices in part to reduced availability of pricing information for single stocks.

Certain opening and re-opening procedures hindered timely and transparent openings

NYSE Arca, which primarily lists ETPs, is a fully-electronic market where all securities open at 9:30 a.m. Corporate securities are listed on the NYSE where selective procedures prioritize price discovery over opening time and allow for securities to open at a later time under certain circumstances. The specific procedures that presented challenges are detailed below, along with mechanisms for their enhancement.

Pre-opening imbalance information: NYSE begins disseminating order imbalance information for each security at 8:30 a.m. It includes real-time order imbalances that accumulate prior to the opening transaction and the price at which interest eligible to participate in the opening transaction may be executed in full.

Prior to October 26, 2015, this information was disseminated only until a security is open or until 9:35 a.m., whichever occurs first. This could have resulted in reduced transparency in the event that certain securities didn't open until after 9:35, as happened on August 24. As a result of the change on October 26, order imbalance information is now disseminated until the opening time of each security, even if later than 9:35.

NYSE DMM opening process: At 9:30 a.m., NYSE DMMs begin to open each NYSE-listed security. As described in NYSE Rule 123D, DMMs are expected to open the security as close to 9:30 a.m. as possible, but may open a security late, particularly if there is a price disparity or an imbalance. On a typical day, most securities are open by 9:31 a.m. In 2015, 86% of NYSE securities (2,825) were open by 9:31 and 98% (3,223) were open by 9:35, on average. On August 24, because of extreme price changes and imbalances, DMMs delayed the openings as provided for in NYSE rules to dampen

volatility: NYSE DMMs opened 54% of securities by 9:40 a.m. and 71% by 9:45 a.m. This extended opening period may have reduced transparency about pricing of certain NYSE-listed securities. NYSE is progressing enhancements to this process, as described in Section 5.

Automated open: One of the DMMs' most critical responsibilities is to open the market in a fair and orderly manner. These openings can be conducted electronically, subject to meeting a set of price and volume guidelines meant to ensure proper price discovery. To improve efficiency on more volatile days, NYSE is enhancing the parameters used for when a DMM may automate an open, rather than open manually as described in Section 5.

DMM mandatory indications: For most securities – those priced from \$10.00 to \$99.00 – NYSE Rule 123D requires DMMs to publish Mandatory Indications if a security's price change is 10% or \$3.00 from the prior close. This is an attempt to highlight and reduce volatility for a single stock. Rule 123D also requires the DMM to receive Floor Official approval to open the stock at a price that deviates significantly from the prior day's closing price. The DMM must wait three minutes after the first indication, and one minute following any subsequent mandatory indications, before opening the security, and they may not open the security outside of the published range. This gives market participants an opportunity to react to the additional information to facilitate a more orderly opening of securities, so that a significantly-changed indication isn't immediately followed by an open at an unexpected price. Because of the procedures involved in publishing Mandatory Indications, including the need for Floor Official review and approval, during periods of market-wide volatility, NYSE's Rule 48 is designed to enable the fair and orderly opening of securities by lifting the obligations on DMMs to publish Mandatory Indications. Though not mandatory, if Rule 48 is in effect, DMMs may still publish price range indications. NYSE is now enhancing these procedures to improve the transparency of pre-opening indications on volatile days, as described in Section 5.



4 Potential solutions

The solutions listed in this section are those which NYSE believes could have the most positive immediate impact on market structure.

Immediate priorities

Adjusting double-wide bands to allow for smoother recovery after price dislocation

Rationale: The use of double-wide bands during the first fifteen minutes after market open creates a situation where a security may drop by a greater amount (e.g., 10%) in the first 15 minutes of trading but afterwards recover by less than half that amount before hitting a new halt. On August 24, 50 LULD halts occurred at 9:45 a.m. and over 60% of all LULD halts were limit up halts, and most (88%) of the limit up halts triggered after the LULD bands tightened at 9:45, when the double-wide band narrowed to regular ranges.¹⁵ In cases where bands for ETPs hit limit down during market open, double-wide bands inhibit price recovery because the reduced bands after 9:45 a.m. can force security prices to take longer to recover than they did to decline. An extension of double-wide bands for securities that fall during the market open, at least until a return to the opening price, would have allowed for more orderly price recovery.

Implementation considerations: Adjusting bands to allow price recovery only for securities that fall during the market open, when double-wide

bands are in place, would add complexity to the market and could lead to a lack of understanding among market participants about the calculation and operation of bands. It is also possible that these adjustments, and how they are implemented, could differ by exchange, again adding to confusion and complexity. Therefore, any changes would have to be accompanied by a strong effort to ensure market participants are educated about the operations of bands.

The simplest solution would be a removal of double-wide bands, but in that case, high volatility at market open could routinely lead to additional halts. NYSE would therefore recommend exploring bands that allow securities affected by double-wide bands to recover in price without halting (potentially for a period of time expected to be sufficient for stabilization or based on a pre-halt reference price), at which time bands could revert to regular bands. An alternate option is that bands could be consistent throughout the day until a halt is breached, and then widen after each successive halt to prevent frequent halting and allow room for price recovery, as seen in the futures market.

¹⁵ www.sec.gov/marketstructure/research/equity_market_volatility.pdf

NYSE view: “Smart bands” that apply when double-wide bands are breached at the market open would enable price recovery in line with declines. However, similar objectives could be achieved through other adjustments to LULD rules described below, such as clearing imbalances before a re-opening is implemented, whether by delaying the auction to allow liquidity to gather or by widening re-opening auction collars.

“The purpose of bands is to check price movement, and double-wide bands simply defeat that purpose because it is ‘elevator down’ at the open and ‘stairs up’ at 9:45”
— Market maker

Extending trading halts to clear order imbalances before re-opening the security

Rationale: Extending trading halts until all imbalances clear would prevent halts from being repeated in succession, which disrupts trading and worsens price uncertainty and dislocations. While extended halts for equities could increase the instances and durations of price dislocations for ETPs, clearing imbalances would increase confidence in the price levels discovered at the end of halts and thus incentivize market makers to provide additional liquidity.

Implementation considerations: If large imbalances persist, the re-opening auction could be delayed for a specified period to allow the market to respond and step in to clear imbalances. Alternatively, collars for auctions could be automatically widened if significant imbalances persist after the first halt.

NYSE view: Clearing order imbalances before completing re-opening auctions of securities would reduce the incidence of subsequent halts. Increased confidence in price discovery would offset liquidity challenges that could otherwise arise as a result of longer halts.

“There’s absolutely no point in ending a halt if we’re just going to hit another one... we’ll all be happier if the imbalances are cleared before trading starts again so we can have a price that actually reflects what the market wants”
— Market maker

“What we need is not a time-based halt but a liquidity-based halt”
— Market participant


Consolidation of all eligible trading interest into the re-opening auction during a LULD halt

Rationale: Routing all marketable orders to the primary exchange during a halt would allow for transparency into liquidity and allow imbalances to be cleared more quickly. It would also reduce instances of re-openings followed by halts due to significant unfilled order flow at non-primary exchanges. During market-wide events, liquidity providers would be able to direct limited resources to the primary exchanges, allowing for a more efficient clearing of imbalances.

Implementation considerations: Non-primary exchanges could perceive that they have financial disincentives when routing orders to the primary. Therefore, exchanges with a higher number of listed securities could be seen as benefiting disproportionately from order consolidation during halts. Further, broker-dealers might not want to “lose control” of their order placement, as re-opening procedures are different across exchanges and their orders may be executed in a different exchange environment than originally intended.

NYSE view: Consolidation of order imbalances during a halt situation would lead to a more robust price discovery mechanism for the U.S. markets. Further, the financial impact is likely to be marginal given the small number of halts compared to total trades. This solution would require stakeholder agreement and harmonization on the routing processes. Further analysis and discussion should

be undertaken to understand the risks of non-primary exchanges having no order books during halts.




"If we're not combining order flow after a halt, we're not maximizing execution at the best price. We're making another halt more likely"
— Market-maker

Harmonization of LULD re-opening auction procedures including collars, liquidity aggregation, and handling of imbalances

Rationale: Uncertainty around re-opening procedures after trading halts, especially in volatile market situations, can result in reductions in market maker liquidity. Different rules across exchanges also greatly add to market complexity, making it more difficult for market makers and investors alike to navigate market structure.

Implementation considerations: A good starting point for harmonization would be post-halt re-opening procedures that can be simplified and made consistent across exchanges. Auction collars for re-openings as well as the aggregation of liquidity, in case of halts, could also be harmonized.

NYSE view: Harmonization of select rules across exchanges is of paramount importance to reducing market complexity, making it easier for liquidity providers and takers to trade in a reliable environment.



"There are so many variations in rules that even issuers and market makers find them difficult. How can we expect retail investors who have another day job to keep up?"
— Market participant

Actions to ensure price bands are in effect when a security re-opens following a halt

Rationale: Markets are presently able to resume trading once they receive the re-opening price from the primary exchange, but situations arise where trading resumes before price bands have been disseminated and applied. As a result, there were instances on August 24 when price bands were not in effect for 2-3 milliseconds after the re-opening of a security, leading to a sharp decline in its price and a subsequent and immediate halt.

Implementation considerations: Exchanges could wait to resume trading until they receive the bands from the SIP. Primary exchanges could calculate the LULD bands for the re-opening internally until received by the SIP.


NYSE view: LULD price bands should be applied immediately to any re-openings, as instances of steep price declines after reopen reduce confidence in protection provided by these bands.

Synchronization of Clearly Erroneous Execution rules and LULD bands

Rationale: Lack of synchronization between CEE rules and LULD bands have raised concerns among market participants that volatile price swing executions within LULD bands might later be cancelled. The incongruence between LULD and CEE rules creates room for instances where CEE limits are narrower than LULD bands, and a trade can thus be cancelled later for exceeding CEE rules even if it was executed within LULD bands. This uncertainty reduces market maker confidence and adversely impacts the liquidity contributed by market makers, especially during times of increased volatility.

Implementation considerations: An immediate and complete removal of CEE provisions could have unintended consequences, as they can help protect the market from “fat finger” errors. A better approach would be to synchronize CEE and LULD rules until some of the other challenges that lead to executions outside LULD are reviewed. Synchronization should address the stock tiers across LULD and CEE, the percentage ranges for bands, and the use of double wide LULD bands at market open as discussed above.

NYSE view: Synchronization of CEE rules and LULD bands would significantly address market maker reluctance to provide liquidity during highly volatile periods by reducing concerns about cancelled trades.



“If we’re concerned our trades might be cancelled later, then we have no choice but to be a lot more reluctant to provide liquidity, because it means we’re assuming the additional risk of an imbalanced book at the end of the day”

— Market maker


Potential guardrails (such as additional order warnings and pre-identified limits) around market and stop-loss orders

Rationale: Retail investors, in particular, sometimes aren’t fully aware of the functioning of various order types and their behavior during periods of high volatility. Market and stop-loss orders, while generally resulting in orderly executions, can at times quickly and directionally drive prices, further dry up limited liquidity, and therefore potentially cause surprising losses to investors who may not have fully understood the implications of their order-type decisions. Broker-dealers and wealth managers are best placed to help protect investors when they submit orders, and could consider more strongly encouraging investors to put a limit on their orders

or to utilize “stop-limit” functionality (such that a triggered stop results in a limit, rather than a market order).

Potential guardrails could include requiring retail investors to specifically acknowledge the risks involved in market and stop-loss orders before using them, ensuring limit orders with reasonable pre-populated limit prices are the default order type, and/or recommending that customers replace entered market orders with executable limit orders via an “Are you sure?” confirmation screen¹⁶. As an example, at least one online broker already does not allow retail investors to place market orders until after 9:45 a.m., in order to reduce risk during the most volatile time of the day.

NYSE view: Guardrails, such as additional order warnings and pre-identified limits, would keep many investors from executing trades at unintended prices and reduce both losses and downward pressure on prices in times of volatility. In recognition of the potential consequences of stop-loss orders, NYSE will no longer accept stop-loss orders on its systems as of February 26, 2016. (This does not preclude retail investors from sending stop-loss orders to the NYSE via broker-dealer order entry tools, most of which handle stop triggers internally and simply send a market order to the Exchange.) NYSE Arca does not currently accept stop-loss orders in any event.



“Especially after what happened on August 24th, I’m already asking my team to convert a lot of stop-loss orders into stop limits proactively after consulting with their clients”

— Broker-dealer

“The solution is not more rules but more self-governance”

— Wealth manager

“A lot of registered representatives need to be held accountable”

— Broker-dealer


A renewed effort to increase the education of all market participants

Rationale: As described above, many retail investors and advisors do not completely understand evolving market structure and trading rules, and therefore can have disproportionate losses in volatile markets because they utilize order types that can be executed at unintended prices. Trading in today's markets is more fragmented. As a result, during volatile periods, market and stop-loss orders, contrary to the expectations of many retail advisors, can increase the risk of poor execution rather than protecting investors. Advisors and registered investment advisors (RIAs) can be educated on the specifics of halts and re-open rules so they, in turn, can educate retail investors. Market makers can also benefit from increased education about rules that can be invoked in volatile markets, so that expectations can be adjusted and they can respond quickly, rather than withholding liquidity due to uncertainty regarding applicable rules.

A renewed focus on education should have three main prongs: reminders to RIAs and financial advisors about trading halt rules and the precise functioning of order types such as market and stop-loss orders; education of retail investors on market and stop-loss orders through materials provided at the time of sign-up for brokerage services; and education of market makers and institutional advisors on halt rules and auction procedures.

Implementation considerations: An important consideration is the vehicle for providing education. NYSE believes that regulatory organizations and exchanges could oversee the education of RIAs, advisors and market makers, while broker-dealers could take on the responsibility of educating investors. One of the options suggested was enhancing the Series 7 requirements.

NYSE view: A renewed focus on educating market participants will have multiple benefits. Empowered with a better understanding, investors will be better protected and more comfortable trading in their accounts.



"Investors think stop-loss orders are a way of minimizing risk; they don't understand just how risky they can be. Then their stop loss at \$40 is executed at \$20 and they are understandably upset. That's the information gap we need to correct"

— Market participant

"ETPs weren't even in Series 7 documentation until 5-7 years ago, and most people took their exams years before that. The Financial Industry Regulatory Authority [FINRA] should make everyone who wants to be an ETP advisor take the chapter in Series 7 again about market orders"

— Market participant

Solutions to be evaluated further

The proposals in this section will be explored further by NYSE along with market participants, but require further analysis prior to being recommended for implementation.

Extension of the LULD Limit State before a security enters a halt

Rationale: Allowing securities to continue trading within LULD bands, while not executing trades beyond the bands, would allow for “rational” trading to continue with protection from price movement outside LULD limits. Market participants would have more time to respond to imbalances to prevent a trading halt than the current time of 15 seconds. As a result, the markets would be better able to self-correct without entering a true halt state, which can disrupt price discovery and necessitate a complex re-opening procedure. A longer Limit State needs to be considered alongside other potential solutions, such as the extension of halts before the clearing of order imbalances¹⁷.

Potential unintended consequences: An extension of the Limit State might allow further buildup of orders outside the LULD bands rather than giving the market the time it needs to reevaluate its direction.

Implementation considerations: The appropriate time period for the Limit State and potential complexity for market participants would need to be considered when designing a solution.

NYSE view: The present effectiveness of Limit States in readjusting prices without needing subsequent halts is an important consideration that will need to be evaluated further in early 2016. Additional analysis is required to understand the potential for impact (e.g., proportion of securities that would exit Limit State if it were extended beyond 15 seconds), and implementation would require cross-market coordination alongside the SEC.



“A longer Limit State like in the futures market would give us the time we need to adjust. Why stop trading when a longer Limit State achieves the same goal?”

—Market participant

Additional Market Wide Circuit Breakers (MWCBs) based on the number of halted securities

Rationale: Today’s Market Wide Circuit Breakers (MWCBs) halt trading when the S&P 500 index declines by a certain percentage from the prior day’s closing price. In cases where a large number of securities are halted, the S&P 500 index price is likely not updating in real time to reflect currently-perceived market conditions, and may then update discontinuously as various numbers of securities resume trading at new prices at slightly different times. Linking MWCBs to a large number of halted securities would give the market time to adjust to new information collectively, rather than having to deal with the confusion caused by numerous trading halts and resumptions in rapid succession. (Further, LULD bands, as a single-stock mechanism, were not designed to address broader market volatility.)

Potential unintended consequences: MWCBs disrupt trading across all asset classes and exchanges and should therefore be reserved for only extremely rare events rather than to provide protection against volatility in general. Additionally, the market-wide re-opening process comes with additional challenges and can add to uncertainty and volatility, so MWCBs should be triggered sparingly.

¹⁷ BlackRock, US Equity Market Structure, Lessons from August 24. (October 2015)

Implementation considerations: Consensus would have to be built around which securities and thresholds should trigger a MWCB. One option could be to use securities in the S&P 500 index, since that is the underlying index on which current MWCBs are based. Analysis of days and events with historic volatility levels would then be needed to decide what number or percentage of halted securities should potentially trigger an MWCB.

The additional MWCBs could be based on securities halted at any point during the trading day, or on cumulative securities halted since the start of the trading day. The threshold for the number or percentage of securities that would have to be halted to trigger an MWCB, and the set of securities they would be drawn from, needs to be explored in greater detail.

NYSE view: While additional MWCBs could add complexity due to the re-opening process and contribute to investor fears, allowing the market to pause in cases of extraordinary volatility across securities is a worthwhile objective in extreme scenarios. NYSE proposes a data-driven approach to identifying the optimal thresholds in addition to an industry-wide dialogue on the potential impact.

“Fifteen years from now, when my daughter is reading a finance textbook, she’s not going to read about the times an MWCB kicked in and nothing happened. She’s going to read about when it didn’t kick in and massive disruption occurred”
— Broker-dealer

“We have talked a lot about LULD [which addresses single-stock volatility] ... but the real problem is the inability to appropriately recognize and address market-wide volatility”
— Market participant

Ensuring appropriate incentives for market makers who assume increased obligations to provide liquidity

Rationale: Ensuring appropriate incentives for market makers who take on liquidity-providing obligations would help increase liquidity in periods of volatility. Greater rebates or other incentives could be used to compensate market makers adequately for risks.

Potential unintended consequences: By providing greater liquidity in volatile conditions, market makers risk larger losses. Increasing obligations could consequently lead market makers to exit the market entirely. Greater incentives for market makers might make a difference at the margin but will not be sufficient to induce liquidity when measured against the heightened risks in volatile markets.

Implementation considerations: Even with greater incentives, market makers might be understandably reluctant to take on obligations that could be risky in volatile conditions. Incentives therefore may not be enough to make more than a marginal difference to liquidity. One option to consider would be to provide additional incentives specifically for providing liquidity during the market open, re-opens, and at the close.

The impact of the Market Access Rule (MAR) on liquidity on August 24 should also be analyzed by regulators as market makers pulled out of the market because they hit risk thresholds established for internal protections and to comply with the MAR. Market makers have had the opportunity to evaluate their individual settings in compliance with the rule during a volatile event and may adjust thresholds, but if compliance with regulatory obligations is the reason that market makers did not provide additional liquidity on August 24, incentives alone will not suffice. Rule changes around market maker obligations may be needed alongside incentives that compensate market makers for additional risk.

NYSE view: NYSE is committed to improving liquidity and will continue exploring ways to strengthen incentive programs for liquidity providers while reassessing the corresponding obligations.

“The idea of obligating market makers, particularly in times of high market volatility, is probably the quickest way to get them to exit the market rather than enter it. No incentives are enough to risk [the solvency of] their business”
— Market participant

“Look at what happened to Knight Capital. No incentives are enough to make market makers put their firms’ solvency on the line”
— Market maker

Regulation SHO exemptions for bona fide market making in support of hedging transactions

Rationale: If market makers are not able to hedge long positions when they take on risk, they will likely withhold liquidity¹⁸. The increasing cost of capital exacerbates this problem. Making it easier for bona fide market makers to hold short positions, whether for a liquidity provision in illiquid ETPs or for hedging purposes, will increase available liquidity.

Potential unintended consequences: The exemptions may have only a marginal impact in times of high volatility.

Implementation considerations: One option is to exempt market makers from the Regulation SHO restriction on the price at which a security can be sold short in the event of the security declining 10% in one day. The other option is to provide market makers with additional days to close short positions. This exemption would be only for bona fide market-making activities, e.g., the short sale of one security vs. the purchase of another, correlated security as part of providing liquidity to the market.

NYSE view: The costs and benefits of Regulation SHO exemptions for bona-fide market making should be assessed and discussed with the SEC.

“There is no question that market makers are reluctant to buy something when they think it’s hard to have an offsetting trade. To the extent that market makers are prohibited from hedging, they are restricted from making markets”
— Market maker

“The exemptions could just be a wish list. I really don’t think market makers are going to try to catch a falling knife because they have more time to close short positions”
— Market participant

Review of LULD percentage band tier categories for all securities

Rationale: The LULD Tier categories establish the percentage bands for LULD. The existing tier categorization does not adequately factor in the liquidity profiles of stocks and ETPs, and can therefore be an inappropriate base for the LULD percentage bands, resulting in an excessive number of halts.

Potential unintended consequences: Changes to LULD Tiers could unnecessarily increase market complexity, with limited benefit.

Implementation considerations: Any changes to tier selection and bands would be made to ensure securities are more accurately bucketed based on their trading and liquidity profiles rather than by two broad indices (S&P 500 index, Russell 1000 index) for stocks and the \$2 million average daily volume threshold for unleveraged ETPs.

NYSE view: A review of LULD Tiers is warranted and could help to address the problems resulting from numerous halts in a subset of securities.


¹⁸ Browne, Reginald: Letter to SEC Equity Market Structure Advisory Committee-SEC (October 26, 2015)

Alignment of halt procedures among equities, ETPs and futures

Rationale: Highly-liquid equity index futures are broadly used by equity market makers for price discovery and hedging purposes. Market makers' ability to hedge positions is therefore inhibited when futures are down-limit. Halts in equity markets for both stocks and ETPs could therefore be linked to down-limit states in the futures market in order to reduce situations where liquidity for securities is reduced due to futures market events.

Potential unintended consequences: Certain liquid equities and ETPs might be able to continue to trade in an orderly manner even with futures halted; imposing halts on these securities due to futures-market events could impede price discovery unnecessarily.

NYSE view: Opportunities to adopt consistent best practices between the equities and futures industry (e.g., easily consistent and accessible price band information) should be carefully considered. One challenge here results from the U.S. regulatory structure: equities markets are regulated by the SEC, whereas most U.S. futures markets are regulated by the CFTC. SEC- and CFTC-regulated markets should work together with their respective regulators to adopt an appropriate and consistent market structure where possible.



"The problem on August 24 was that futures were limit down before the market opened and so market makers couldn't hedge their trades. We need to consider aligning the two because it's hard to provide liquidity in a volatile market when you can't hedge"

— Market maker

"The solution needs to be simple, above all else"

— Market participant

Solutions that could carry significant unintended consequences

The proposals in this section likely carry significant unintended consequences, and are not recommended by NYSE at this time.

Halting ETPs based on INAV or the number of underlying securities halted


Rationale: Trading halts for individual ETPs based on the proportion of underlying securities halted could more accurately reflect the need for market forces to pause. Halting, or imposing price bands on, ETPs based on some measure of the true portfolio price (i.e., Intraday Net Asset Value or INAV) could prevent trades from happening at adverse prices.

Potential unintended consequences: A greater number of ETP halts would reduce pricing dislocations but increase trading disruptions and disturb the price discovery mechanism that is a key element of US market structure. ETPs based on internationally traded securities, bonds, and other asset classes regularly trade in the US without concern when pricing information for the underlying securities is unavailable, so it is difficult to justify linking ETP halts for US equities. Prices continue to remain the simplest and best indicator of a market's collective view.

Linking halts in ETPs to the INAV would be complicated by the complexities of assessing the true value of the underlying portfolio intraday. For many ETPs, the Exchange-Traded Product shares are more liquid than the underlying shares, meaning price discovery may actually function in the other direction. INAV calculations are also not fully standardized in the industry, and are not generally computed in real-time but may only, for example, be disseminated every 15 seconds or at some other periodic interval. Introducing trading rules depending on an INAV would require implementation of significantly more robust and standardized INAV computation and dissemination procedures, significantly complicate ETP market structure, and preclude the use of ETPs as valuable price discovery

vehicles in many circumstances.

NYSE view: Halting ETPs based on underlying security prices would hinder broader market-wide price discovery and add to complexity. Replacing price with additional or alternative metrics will increase complexity and raise concerns over standardization.



“The beauty of ETFs is that they let you express investment views and facilitate price discovery. Linking halts in ETPs to underlyings would ruin this critical ETP mechanism”
— Market participant

Lowering the thresholds for MWCBs with the goal of triggering them more frequently

Rationale: MWCBs are disruptive but have to be compared to the extended confusion and disruption of frequent halts in a large number of securities. There is a definite tradeoff between halting trading and disrupting market activity on the one hand and incentivizing liquidity to re-form on the other. Discontinuous markets are not desirable, but lowering thresholds for MWCBs will allow liquidity to be replenished by helping the market reassess and might be preferable to disconnected and unsynchronized pauses. Further, abnormal market events are going to occur at some point, and the market could be better prepared if there were more frequent “fire drills”.

Potential unintended consequences: Lowering thresholds for MWCBs would make them more frequent, and could make trading more disruptive – not just because of the market-wide halt, but because the re-opening process can be disorderly and complicated, as noted above. Further,

more frequent MWCBs would create additional uncertainty, especially among the investing public, and create additional “headline risk” (e.g., red banners on cable financial news channels, increasing investor concern).

NYSE view: MWCBs are disruptive and should be rare events. Industry readiness does not have to be achieved through additional, disruptive MWCB triggers but can instead be achieved by exchanges running annual or semi-annual tests with mandatory participation.



“Making MWCBs more frequent is a surefire way of making the industry look bad ... We shouldn’t focus on making MWCBs more likely, but on fixing trading rules to reduce the likelihood of MWCBs”


— Market participant

Simply widening LULD bands across the board

Rationale: Presently, frequent LULD halts reduce liquidity by increasing pricing uncertainty and facilitating ETP price dislocations. Widening LULD bands would reduce the number of trading halts, thereby allowing for greater market-led price discovery and continuity in trading. Fewer halts in underlying securities would also reduce price dislocations for ETPs.

Potential unintended consequences: Wider bands would reduce the protection provided to investors in the case of rapid price declines and reduce the “breathing room” that halts give to market makers to allow reassessment. Fear of decreased protection could also hinder liquidity in times of volatility by increasing the vulnerability of market participants and investors to more drastic price changes.

NYSE view: Wider bands might reduce the frequency of LULD halt disruptions, but would also reduce investor protection against drastic price movements. Such a consideration should be framed with the protection of retail investors in mind.



“The problem is that we have tension between issuers and market makers. Issuers don’t want prices to move more than 1% from their fair value but traders want to be able to trade without halting. We need wider bands to keep the market going”

— Market participant

Using INAV as a reference price for LULD bands during regular trading

Rationale: The current reference price does not comprehensively take into account the differences in volatility across securities. The reference price could be linked to average trading price over a longer period of time to better reflect market volatility in the security. In volatile markets, there is no established safeguard linking reference price to INAV. Alternatively, therefore, bands could be based on Intraday Net Asset Value (INAV) to prevent dislocations.

Potential unintended consequences: Changing the reference price computation will not solve the deeper structural issues related to bands as described in prior examples, and might add more complexity to the market. As noted above, linking the reference price to INAV would also inhibit the price discovery mechanism of ETPs. The lack of standardization in INAV calculations could cause further complications.

NYSE view: Changing the reference price during regular trading will not increase liquidity or reduce frequent halts, and could instead add complexity.

However, better price discovery can be facilitated by changing the first reference price of the day, in cases where there are no trades in the opening auction, to the previous day's closing price on the primary instead of the midpoint of the bid-ask.

"We can change the reference price but there's no big impact from that. We haven't fixed the real problem of pricing dislocations, and reference prices aren't going to fix that"
— Market participant

"We have internally-linked ETPs and especially for us, INAV is not a meaningful metric"
— Market participant

Eliminating auction collars

Rationale: Auction collars can sometimes be considered too narrow to allow for natural price discovery by restricting price movement to a forced band. Wider auction collars for opening auctions and re-openings would allow for more price discovery, decreasing the likelihood of frequent halts.

Potential unintended consequences: Absent other market structure changes (such as ensuring full satisfaction of order imbalance prior to reopening), removing auction collars altogether would reduce the level of protection provided to investors from "fat-finger" and related errors.

NYSE view: As discussed in the following section, NYSE Arca's Market Open Auction Collars have already been widened to increase the range of price discovery. Pending SEC approval, NYSE Arca will also be widening re-opening auction collars. Our previous suggestion of structuring auctions to clear order imbalances before a reopen would also help achieve objectives similar to wider collars; in circumstances such as "fat-finger" errors, collars may provide an additional layer of protection.

"When the market opens down 5% but the collars restrict movement to 1%, the person selling gets a great deal – but it was the wrong price. Why are we encouraging trades we know any reasonable market participant would look at and say was not a good trade?"
— Market maker

"I don't think zero protection is the answer"
— Broker-dealer

Modified rules during volatile markets

Rationale: Different trading rules for volatile markets, presumably including wider LULD bands and auction collars, would reduce the number of trading halts and allow markets to trade more freely without disrupting natural price discovery. This would also allow markets to react to genuine events with fewer restrictions.

Potential unintended consequences: Any additional definition of specific volatility parameters will increase uncertainty and add complexity to the market rules, making trading for equities and ETPs more difficult. Liquidity could also be withdrawn further because of the decrease in protection due to wider bands or collars.

NYSE view: Significantly different trading rules, such as different LULD bands or collars, based on a classification of "volatile trading days" would add unnecessary complexity and uncertainty to the market.

A different set of bands for equities and ETPs

Rationale: Narrower LULD bands for ETPs would provide the appropriate protection necessary for investors as ETPs are expected to trade within tighter bands on days of regular volatility.

Potential unintended consequences: Different rules for ETPs will add a significant amount of complexity to the market. A major shortcoming in market structure as it stands is the lack of harmonization of rules across different products and exchanges. Creating new rules for ETPs would exacerbate the problem.

NYSE view: Different bands for ETPs would add unnecessary complexity and further reduce harmonization.



“ETFs haven’t gotten enough attention over the years given how fast they’ve grown. Unlike stocks, we know where an ETF should be trading because of the INAV. The rules for ETFs, including bands and collars, need to reflect that”

— Market participant

5 Actions taken by NYSE Group

New York Stock Exchange enhancements

Dissemination of order imbalance information until a security opens

On October 26, NYSE made changes allowing for the dissemination of order imbalance information until a security opens. Previously, this information was disseminated only until 9:35 a.m. or when the security opened, whichever came first. NYSE is improving transparency of pre-opening indications on volatile days. On August 24, the combination of securities not opening by 9:35 a.m. and fewer Mandatory Indications limited the amount of imbalance information. NYSE to file with the SEC for revisions to Rule 15 to require DMMs to publish pre-opening indications in securities if there is a significant price change of 5% from the last sale. On volatile days, when as of 9:00 a.m. the E-mini S&P 500 futures move more than 2% from the prior day's closing price, DMMs under the new rules would be required to publish pre-opening indications in securities if there is a 10% price change. On August 24, if the 10% parameter were in place, pre-opening indications would have been required in 278 securities.

NYSE is also revising Rule 123D, to allow DMMs to open securities electronically unless there is a price change of 4% from the last sale or the opening trade would be more than 100,000 shares. On volatile days, when as of 9:00 a.m. the E-mini S&P 500 futures move more than 2% from the prior day's closing price, the percentage requirement will be doubled, allowing DMMs under the new rules to open securities electronically unless there is a price

change of 8%. On August 24, if the 8% parameter were in place, DMMs would have been required to only open 573 securities manually compared to 2,647 actual manual opens that day¹⁹.

Discontinuing acceptance of stop-loss orders

Beginning February 26, 2016, NYSE will no longer accept stop-loss orders (NYSE Arca already does not accept stop-loss orders). Many retail investors use stop-loss orders as insurance or a method of protection but may not fully understand the risk profile associated with the order. Given the evolution of U.S. equities markets, including the speed of information dissemination and expansion of trading venues, stop-loss orders have a higher risk profile than they historically had, especially during volatile periods.

On August 24, NYSE observed a significant increase in market orders and stop-loss orders, which converted to sell market orders as a result of the fast-falling market. While market orders guarantee an execution, the executed price could be significantly away from prior prices during times of extreme volatility when there are thinner levels of liquidity provision and liquidity gaps. Not only may the stock execute well below the level where the stop-loss order was intended to execute, the stock may quickly recover its value, resulting in investor dissatisfaction with earlier stop-loss fills. (As noted above, broker-dealers can continue to support investor use of stop-loss orders, even if the exchanges do not do so directly.)

¹⁹ NYSE supports its opening procedures as overseen by DMMs, who commit capital and take risk to improve the price discovery process, but strives to open securities as close to 9:30 a.m. as possible. On a typical day, nearly 100% of stocks are opened by 9:35.

NYSE Arca enhancements

Wider market collars for the initial opening auction

Given heightened volatility and customer feedback, on September 8, NYSE Arca restored the wider opening market collars in effect in early 2015. Market participants noted that tighter trading collars may have constrained the ability to participate in auctions on August 24, due to high volatility and large price moves. The exchange believes that price collars must strike the right balance between protecting investors from excessive price movement and allowing for broad auction participation to facilitate price discovery. Accordingly, on September 8, NYSE Arca restored the collar percentages to 10% (for prices up to \$25), 5% (for prices of \$25.01-\$50.00) or 3% (for prices greater than \$50.00) vs. previous limits of 5%, 2% and 1%.

Wider market collars for re-opening auctions

NYSE Arca is widening re-opening market collars percentages, subject to effectiveness of an SEC rule filing. For consistency with CEE thresholds, the market collars for re-opening auctions will also be at levels of 10%, 5%, and 3%, depending on the price of the security. (NYSE Arca is preserving the existing tighter collars of 5%, 2%, and 1% based on security price for the closing auction to ensure an orderly close in line with prevailing prices at the time; unlike openings and re-openings, the closing auction does not reflect a new process of price discovery following an overnight or intraday suspension of trading.)

Automatic extension of trading halts in case of substantial order imbalances

NYSE Arca is adding logic to automatically extend halts absent sufficient book quality. Extending the re-opening auction when there is a substantial order imbalance may help the market to arrive at a more stable price level and reduce multiple halts in the same security. LULD rules allow the primary exchange to extend the re-open beyond five minutes if there is a significant order imbalance. While trading centers may begin trading after 10 minutes regardless of whether the primary market has reopened a security, NYSE generally recommends that trading commence only once the primary market has reopened. This approach aligns price discovery with price protection through an auction that reflects the consolidation of all available liquidity at the time of reopening.

Ensuring LULD price bands have been received from the SIP before resuming trading for non-primary securities

The NYSE Exchanges are making changes so that trading in a halted security will not resume until appropriate LULD price bands are in effect, as discussed above.



6 Conclusion

Market participants have learned important lessons from their experiences on August 24 and the 2010 “Flash Crash,” allowing them to be better prepared to respond in similar situations. Liquidity providers and investors now have a greater understanding of LULD bands, the rules regarding the re-opening process, and how the market may react during volatile times and have adjusted their decision making accordingly. Furthermore, a large number of liquidity providers have noted the change in their trading systems, allowing domestic equity ETPs, for example, to continue to price during times of market stress and halts for underlyings. However, the implementation of a prioritized set of measures to enhance market structure for equities and ETPs could further reduce some of the challenges that have surfaced over the last few years.

NYSE expects that better outcomes due to structural changes, along with increased preparedness of participants, will fall into three major categories:

- **Increased availability of liquidity:** While NYSE does not expect market makers to begin taking substantially increased risks in volatile market scenarios, the expectation is that greater liquidity will be facilitated by removing the fear of “cancelled trades” due to CEE rules. Further, increased harmonization in re-opening procedures after halts could clear lingering imbalances and reduce concerns around how trades will be treated once a security reopens.
- **Better outcomes for retail investors:** A combination of increased guardrails provided by broker-dealers, and more targeted education of

investors and their advisors, could significantly reduce the use of market and stop-loss orders during volatile periods, which can cause severe losses in volatile market situations.

- **Reduced instances of pricing dislocation for ETPs:** For ETPs specifically, better outcomes through structural changes will result in fewer multiple halts and reduce occurrences of the temporary pricing dislocations that were observed during the period of extreme volatility on August 24.

The proposed solutions will not be a panacea for all of the challenges of broad-market volatility. Brief pricing dislocations, for instance, are to be expected when securities hit trading halts. However, structural market changes, self-governance by key stakeholders, and targeted investor education by the financial industry and its participants could go a long way toward removing potential barriers to the continued growth of, and confidence in, U.S. markets.

To further refine its thinking on potential enhancements to market structure, NYSE plans to continue researching a number of other industry-wide and exchange-specific solutions, such as Limit State extensions before halting a security, order consolidation at the primary exchange during trading halts, and Regulation SHO exemptions for market-makers. It will seek to understand whether the benefits outweigh any unintended consequences. The goal should be to make trading during periods of volatility more transparent, rules more consistent and easier to understand, and U.S. market structure

more robust overall. To that end, coordination in implementation of the proposed solutions will be critical, and will require strong collaboration among regulators, exchanges, industry bodies, issuers, market-makers, broker-dealers and investors. Where possible, the industry must also carefully employ back-testing to ensure that the design of the potential solutions provides enduring soundness for the future. Time is of the essence, especially for education-related initiatives, to ensure that the next time broader-market volatility is experienced, the outcomes are significantly different by design.

Debates about recent liquidity events will continue, but as part of our assessment, NYSE found that even without formal regulatory changes to current

market structure, it is not certain that the market would see a repeat of past events. For example, if the conditions of August 24 were to occur once again, the outcome could be very different. The majority of market participants NYSE interacted with are now more informed about the specific rules and triggers embedded in the national market system, and many liquidity providers have changed their trading practices to better manage the effects and impact of major market volatility, in many cases on a faster or more automated basis.

NYSE remains confident in its belief that the strong growth trajectory of these industries shall continue, and be further bolstered by improvements to market structure.

7 Appendix

Table 1 Comparison of May 6, 2010 ("Flash Crash") and August 24, 2015

Item	May 6, 2010	August 24, 2015
Consolidated volume	19.2 billion shares traded over the day, including 4 billion in ETPs	14.2 billion shares traded over the day, including 4.3 billion in ETPs
Volatility	VIX index measured 32.8	VIX index measured 40.7
Unsettling global markets	The market was nervous about the Greek debt crisis. The crash started at 2:32 p.m. The DJIA dropped 3.9% by 2:42 p.m. and was down 9.2% by 2:47 p.m. The crash lasted 36 minutes and quickly rebounded	Uncertainty in China resulted in a 8.5% in the Shanghai Composite overnight. The S&P 500 futures were down as much as 7.1% pre-market, warning of a steep loss in the U.S. market at the open
Widespread use of market orders	There was severe mismatch in liquidity, exacerbated by the use of market orders, including automated stop-loss market orders, and the withdrawal of liquidity by electronic market makers	There was a significant increase in market orders primarily in the first half hour of trading. Market order volume on NYSE was nine times higher than normal and NYSE Arca Tape B (largely ETPs) was six times higher. NYSE stop-loss market orders also increased
Loss of liquidity	"The temporary nature of the decline in prices in the broader market may be indicative of a failure of liquidity." Some firms paused trading because of price volatility, internal risk limits, capacity issues, and other reasons	There was a significant erosion in displayed liquidity provision on Friday, August 21 and Monday, August 24. Market makers were challenged by many factors including extreme volatility, the flood of market orders, concerns of MWCB and CCE rules being triggered and internal risk limits
Internalizers routed to exchanges	"Some internalizers reduced their internalization on sell-orders but continued to internalize buy orders." During the mid-day crash, off-exchange Trade Reporting Facility (TRF) share dropped from 35%-40% to 25%-30%	Internalizers received a large number of market orders and routed more to exchanges, both in stocks and ETPs. TRF share was down throughout the day, particularly in the morning hours of trading during the height of the volatility
Single stock circuit breakers	The only stock circuit breakers were NYSE Liquidity Replenishment Points. 1,000 NYSE LRPs lasting more than a second were triggered between 2:30-3 p.m. compared with 25 on most days	There were a record number of Limit Up Limit Down halts at 1,278 compared to 39 on a typical day. 83% of the LULDs were in ETFs, including repeating halts in the same securities
Stub quotes	More than 200 stocks experienced "stub quoting", which caused stock prices to execute at a penny, primarily in small caps and ETFs	Stub quotes were banned with Rule 4613, which requires market makers to quote within a designated percentage away from the last trade – at least 8% and as much as 30% away
Broken trades	20,761 broken trades in over 300 securities where prices more than 60% away from their values just moments before. LRPs prevented broken trades on NYSE	There were a minimal number of broken trades, around 20, but none were the result of Clearly Erroneous Error claims
Disproportionate impact on ETFs	70% of all US equity stocks that declined 60% or more from their 2:40 transaction price (and ended up broken) were ETFs	ETFs experienced a disproportionate number of large price swings. There were broad-based liquidity issues in ETPs

SOURCE: "Findings Regarding the Market Events of May 6, 2010", Report of the staffs of the CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues. September 30, 2010. <https://www.sec.gov/news/testimony/2010/ts051110mls.htm>
NYSE

Table 2 Regulatory responses to the Flash Crash

	Committee recommendations	Actions taken
Volatility		
1	Streamlined procedures for breaking trades during times of “aberrant price movements”. Implement minimum quoting requirements by market makers – “stub quotes”. Single stock pauses or “circuit breakers” for Russell 1000 stocks and active ETFs	Single stock circuit breakers pilot approved in S&P 500 stocks in June 2010. Clearly erroneous rules approved in June 2010. Ban on stub quotes approved November 2010
2	Pause rules be expanded to cover all but the most inactive securities	Single stock circuit breakers extended to all NMS securities in June 2011
3	Implement and coordinate LULD policies to supplement pause rules and clarify if exchanges should continue to trade during these periods	LULD mechanism approved in May 2012 and began in April 2013. LULD is still a pilot and enhancements are expected
4	Consider “second tier” pre-trade risk safeguards with longer timeframes should be instituted when the “five second limit” does not attract contra-side liquidity	Addressed in CFTC Concept Release on Risk Controls and System Safeguards for Automated Trading Environments, September 2013
5	Evaluate the present system-wide circuit breakers and consider: i. reducing the initial trading halt to a period of time as short as ten minutes; ii. allowing the halt to be triggered as late as 3:30 p.m.; iii. using the S&P 500 index as the triggering mechanism	New Market Wide Circuit Breaker (MWCB) rules approved in May 2012 and rolled out April 2013
Restrictions on co-location and direct access		
6	Develop effective testing of sponsoring B/D risk management controls and supervisory procedures	Rules preventing unrestricted market access adopted in November 2010
7	Strict supervisory requirements on DCMs or FCMs that utilize firms to implement algo order routing strategies; CFTC and SEC review costs/benefits of directly restricting “disrupting trading activities” impacting extremely large orders	Addressed in CFTC Concept Release on Risk Controls and System Safeguards for Automated Trading Environments, September 2013
Liquidity pricing and liquidity rebates		
8	Changes in maker/taker pricing practices – including pricing incentives	Nasdaq low access fees pilot showed declines in liquidity in pilot stocks. SEC’s Market Structure Advisory Committee creates subcommittee on access fees
Market maker obligations		
9	The SEC evaluate whether incentives/regulations be developed to encourage market makers to provide buy/sell quotes that are “reasonably related to the market”	To moderate volatility, SEC exploring “anti-disruptive trading rule” that would focus on the demand side of a liquidity imbalance (not market makers supplying liquidity)
10	The SEC/CFTC explore ways to allocate costs imposed by large order cancellations	Some equity and derivatives exchanges have implemented excessive message fees
Preferencing, internalization, and routing protocols		
11	The SEC study impact of B/D maintaining privileged execution access as a result of internalization or preferencing. Consider whether internalized/preference orders only be executed at “superior” prices and/or subject firms to market maker obligations that require them to execute some portion of order flow during volatility	No action
12	The SEC study the costs and benefits of alternative routing requirements. Recommend that the SEC consider adopting a “trade at” routing regime	The Tick Size pilot is primarily focused on widening tick increments, but includes a “trade at” definition with venue limitation
Information provision		
13	Reporting requirements for measures of liquidity and market imbalance for large market venues	No action
Regulators’ access to information		
14	The SEC should proceed to implement a consolidated audit trail for the US equity markets and the CFTC should similarly enhance its existing data collection regarding orders and executions	The CAT initiative to create a comprehensive database of orders, executions and trader identifications was launched, but no final plan has been approved and no bidder to build the database has been selected

SOURCE: “Recommendations Regarding Regulatory Responses To the Market Events of May 6, 2010”, Summary Report of the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues NYSE

