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Understanding the "Flash Crash"

What Happened, Why ETFs Were Affected, and How to Reduce the Risk of Another

Introduction

There is a saying in the markets that liquidity is like oxygen: you only notice it when it is gone. May 6, 2010, the day of the so-called "flash crash," will thus go down in history as the day when most of the oxygen suddenly disappeared from the markets, and just as suddenly returned, leaving confusion, frustration and cancelled trades – and financial experts, analysts and regulators scratching their heads.

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Although several months have passed since the flash crash occurred, uncertainty remains on the trigger or triggers for the sudden U.S. equity market free fall (and recovery) in the afternoon of May 6. However, the lesson of the event is clear: better rules are needed to protect investors, and to reflect the tremendous evolution that has occurred in the markets in recent years. Innovations in trading and market structure, aided by technology, have created the ability to trade vast amounts of securities at enormous speeds. By improving liquidity, those innovations have largely benefited investors. But the events of May 6 teach us that speed of execution must be tempered with a focus on quality of execution.

In this paper, we explore what happened on the afternoon of May 6, how it affected investors, and what can be done to lessen the likelihood of similar market disruptions in the future.

Background and Effect on ETFs

As the result of several separate but interconnected disruptions to the U.S. equity market on May 6, prices for many U.S. equities and exchange traded funds (ETFs) holding U.S. equities declined precipitously for a period of approximately one half-hour during afternoon trading, an event that has become known as the "flash crash." As neither non-U.S. markets nor fixed income trading experienced this price drop, ETFs holding U.S. fixed-income securities and non-U.S. equities were largely unaffected and generally traded at prices that corresponded to underlying asset values. Many ETFs holding U.S. equities, however, did not.

ETFs have become widely accepted investment vehicles for both institutional and retail investors. As of September 30, 2010, there are 1,051 exchange traded products available in the U.S. market, with a total of $902 billion invested in such products.[1] On average, ETFs represent approximately 30% of the total volume traded on national exchanges.[2] Institutional investors use ETFs for a number of strategies, including equitization, hedging and achieving exposure to otherwise difficult-to-access markets. For their part, retail investors also use them in a wide variety of ways: to build an asset allocation, as part of a core/satellite approach, or tactical investing among sectors, to name a few. ETFs' transparency, low costs and access to a wide range of asset classes have significant advantages that have benefited investors. For example, many investors, both retail and institutional, find enormous value in being able to observe the price of the ETF during the day, and to use trade order types such as stop-loss or limit orders in an attempt to manage the price at which they transact – things that are not possible to do with alternative investment products such as mutual funds. Ensuring that the securities market works effectively, and allows investors to reap the inherent benefits of ETFs, clearly benefits both institutional and retail investors.

While most ETFs are regulated as registered investment companies, they trade on an exchange. They have a primary listing and one or more designated market makers that are obligated to make two-sided markets to buy or sell the ETF. A designated (or lead) market maker usually is required by exchange rules to provide the "best" price available across the secondary market a specified percentage of time. The market price of the ETF is determined by the market maker based on a variety of factors, including supply-and-demand and the current aggregate value of the underlying securities held by the ETF.

ETFs have had a long history of their market price generally trading in line with their intrinsic value, as determined by comparing the closing market price of the ETF with the value of its underlying securities. Under some circumstances, an ETF may trade at a premium or discount to Net Asset Value (NAV) as seen in some financial sector ETFs in September 2008 (when short-selling of 200+ financial stocks was restricted, disrupting market makers ability to hedge exposure to ETFs that held these stocks). These premiums or discounts typically are only a few percentage points of NAV and have not been persistent over time.

1 Source: BlackRock, Bloomberg
2 Source: BlackRock, Bloomberg, as of 30 September 2010

Proper functioning of ETFs relies on fair and orderly market activity that permits market makers to effectively value an ETF's holdings and hedge any exposure to ETF shares acquired. This can be disrupted by extreme market volatility in an ETF's underlying holdings, inability of market makers to access instruments used for hedging, or the risk in extremely volatile market conditions of market makers' fearing their hedging trades could be cancelled because of exchange "Clearly Erroneous Trade" rules. These rules break trades that occur at levels later deemed to be outside of normal market parameters.

For the ETF market, market makers need to be confident in the accuracy of their valuations of the ETF's underlying securities and their ability to sell those securities as a hedge when bidding for the ETF's shares. In order to aggressively bid for and acquire ETF shares in a declining market, market makers need to feel confident that any hedging trades that they put on their books will stand. At the same time, market participants (both retail and institutional) need to see clear linkage between the ETF market price and the prices of the underlying securities of the fund and expect their orders to be routed to the best market for execution.

The Events of May 6

Although the Greek debt crisis and other concerns may have provided a catalyst, four factors converged simultaneously to significantly disrupt U.S. equity markets on May 6 and cause market prices for hundreds of equity securities and U.S. equity ETFs to diverge from their respective underlying asset values.

First, the sudden market freefall in U.S. equity prices caused market makers in ETFs that seek to track benchmarks heavy in the falling stocks to have difficulty valuing the ETFs' underlying assets. Almost 25% of the components of the Russell 3000 Index suddenly dropped by more than 10% in a matter of minutes; in the last year the Index had never dropped more than 3% intraday. Market making pricing models began to struggle as stock prices started to plummet at lightning speed. Market makers' inability to accurately assess the value of ETFs' underlying holdings caused many market makers to discount their bids for ETF shares, leading ETF market values to then also fall. Next, the NYSE set certain stocks into a "pause" or slow trading mode, which results when trading reaches price bands known as "Liquidity Replenishment Points". However, trading in these securities continued normally on other markets, causing the potential for price disparities across exchanges and additional price uncertainty.

Second, anxiety over potential trade cancellations caused liquidity providers to fear that normal ETF hedging strategies would be interrupted, which caused them to pull back from bidding for ETF shares. Many market makers assume the chance of cancelled trades increases as the market approaches a 10% loss, and where there are questions as to the cause of the market drop. Since ETF market makers generally sell shares of an ETF's underlying holdings as a hedge when buying ETF shares, the risk of trades they entered into being cancelled would leave them exposed to being unhedged. As the primary market makers stepped back, other trading firms that normally would base quotes off of the primary market makers had no benchmark, so they too stepped away, especially as the ETFs approached the 10% price decline point. This worsened the liquidity situation.

Third, several other exchanges stopped routing orders to NYSE Arca because they believed the NYSE Arca was not reporting trade executions back in a timely manner. This encouraged market fragmentation, with the potential that trades would not be routed to the market offering the best price. Because ETF trading volume is highly concentrated on NYSE Arca, the disruption in automatic routing of ETF trades to NYSE Arca from other markets with fewer quotes may have made it more difficult for certain ETF orders to access liquidity.

Finally, there was additional selling because stop-loss orders were triggered, which increased the volume of sell orders on affected securities, including ETFs. These stop-loss orders, which turned into orders to sell at "market" prices, were executed significantly below trigger points due to the speed of price freefall. Price declines were exacerbated as increased offers to sell coincided with decreased bids coupled with decreased size of bids as large traders pulled out of the market. Thus, in some instances, the price of the ETF fell farther than the basket of the underlying securities.

Over 90% of the ETFs in the U.S. are listed on the NYSE Arca platform which delivers the National Best Bid and Offer (NBBO) more than 80% of the time for ETFs and handles, on average,

The Four Factors That Converged on May 6

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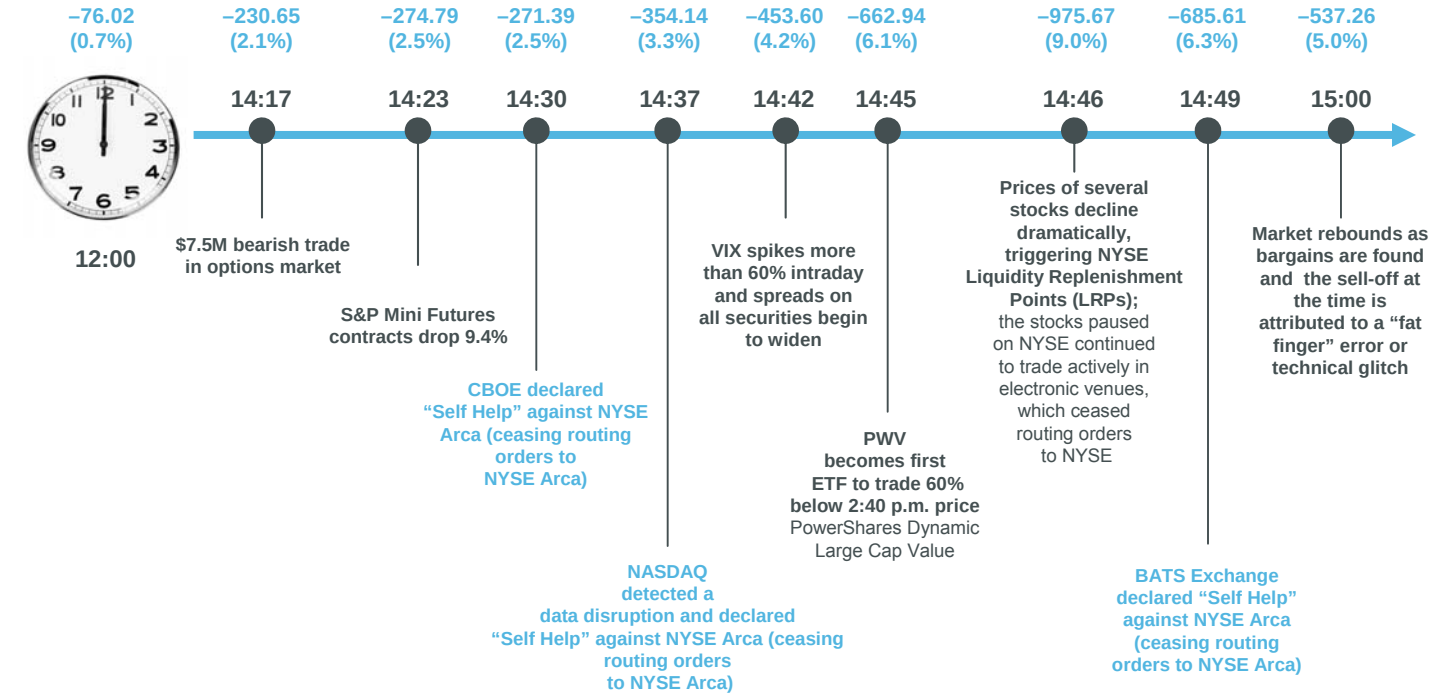
Figure 1: May 6 timeline and sequence of events



Sources: Nomura, U.S. Market Microstructure–May 2010; *Wall Street Journal*; BlackRock.

more than one-third of daily trades in ETFs. The percent of trading volume on the NYSE Arca increases to almost 60% for ETFs with lower average daily trading volumes.[3] The disruption of automatic order routing to normal sources of ETF liquidity may have caused a greater proportion of ETF trades than normal to occur in markets with thinner order books, quickly using up any available liquidity.

In fact, at the end of the trading day, the exchanges determined that any trades executed in excess of 60% away from the value of the security at 2:40 PM EST were to be cancelled. Two-thirds of the cancelled trades were in ETFs, overwhelmingly ETFs that invest primarily in U.S. stocks.

The Impact

While we believe the final impact on investors was relatively limited due to widespread trade cancellations, the events of May 6 were nonetheless disturbing.

To better understand exactly the effect on financial advisors, we commissioned a survey of 380 retail financial advisors in late June to learn from these advisors, one of the largest groups of ETF users, what they think about the flash crash.

The survey revealed that the majority of advisors were minimally affected by the market disruption, and they believe that market structure issues, such as an overreliance on computer systems and some types of high frequency trading, were the primary drivers of the crash. Stop-loss orders, market maker activity or lack thereof and exchange routing issues were seen as secondary issues. As it relates to the macro economic environment, the majority of advisors surveyed expect current market volatility will either increase or remain at today's level over the next six months. Furthermore (and perhaps disappointingly), those surveyed anticipate an event similar to May 6 will likely occur again, no matter what solutions are adopted, underscoring the importance of thoughtful regulatory reform to help prevent future market disruptions.

The survey also indicated that 75% of advisors' accounts were not affected by the events of May 6. Of those accounts that were touched by the volatile trading on that day, the most common cause was a stop-loss order triggered and executed at a significantly reduced value.

Regardless of the cause of volatility – economic or structural – advisors identified ETFs as important investment vehicles to navigate a volatile market environment, followed by bonds and mutual funds. Continued confidence in ETFs was demonstrated in the weeks following the flash crash when ETF trading volume increased from 27% of daily stock market volume (January 1 to May 6) to 30% (May 7 to June 30).

3 Source: NYSE Arca

The Case for Market Reforms

The SEC had market structure reform on its agenda prior to the flash crash, recognizing that markets had evolved but that the rules may not have kept pace. The events of May 6 have put more emphasis on those efforts, and have highlighted the need for regulators, financial service providers and the exchanges to work together on market structure reforms. We believe those reforms should include:

- Uniform mechanisms to curb extreme price volatility for stocks and ETFs across all exchanges. Such mechanisms could include individual stock circuit breakers or, alternatively, price bands (limits on price movements similar to those employed in futures markets). Such mechanisms should, in theory, help prevent sudden and extreme disruptions.

  Objective: Prevent market fragmentation by having uniform exchange approaches to curbing excess volatility.

- Making exchange trade error cancellation rules less arbitrary and more transparent in a manner that does not discourage liquidity providers from providing liquidity at times of market stress. While steps have been taken, current rules still contemplate the cancellation of trades following sudden, large price movements. Ideally, trades would not be cancelled, but the prices of trades occurring at extreme price levels would be adjusted to defined levels in the event of market disruptions. This would provide market makers with greater certainty and less incentive to stop quoting.

  Objective: Participants clearly understand the rules of the road, and the balance between the risks they are taking and the potential opportunities.

- Clearer guidelines for inter-market order routing rules and better coordination among exchanges to reduce likelihood of orders being routed to exchanges with little liquidity or not offering the best price.

  Objective: Investors achieve best execution of their orders.

- Thoughtfully revisiting the obligations and roles of lead market makers to ensure orderly market functioning. For example, lead market makers could be engaged to reopen a halted security following a “circuit breaker” halt, but must provide consistent depth on normal trading days.

  Objective: Designated market makers continue to provide liquidity and maintain orderly markets on volatile trading days.

Recommended Reforms

1. Uniform mechanisms to curb extreme price volatility for stocks and ETFs across all exchanges.
2. Making exchange trade error cancellation rules less arbitrary and more transparent in a manner that does not discourage liquidity providers from providing liquidity at times of market stress.
3. Clearer guidelines for inter-market order routing rules and better coordination among exchanges to reduce likelihood of orders being routed to exchanges with little liquidity or not offering the best price.
4. Thoughtfully revisiting the obligations and roles of lead market makers to ensure orderly market functioning.

Conclusion

U.S. equity market structures as they have developed over the last 10 to 15 years have failed to keep pace with rapid changes in technology and the changed roles of market makers. This has increased the potential for market fragmentation and the potential for temporary disconnects between some equity ETFs and their intrinsic value when market makers react to market volatility by stepping away from providing liquidity.

While it is of some comfort to understand why ETFs were swept into the market instability on the 6 of May, it is encouraging that the ETF industry is working with regulatory and industry partners to help mitigate the effects of similar events in the future and help ensure ETF prices remain stable in the face of liquidity shocks. When our markets do not function in the interests of investors, they need to be fixed. ETF providers are working together with others to move quickly to address this concern.

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